Model Engineer

THE MAGAZINE FOR THE MECHANICALLY MINDED

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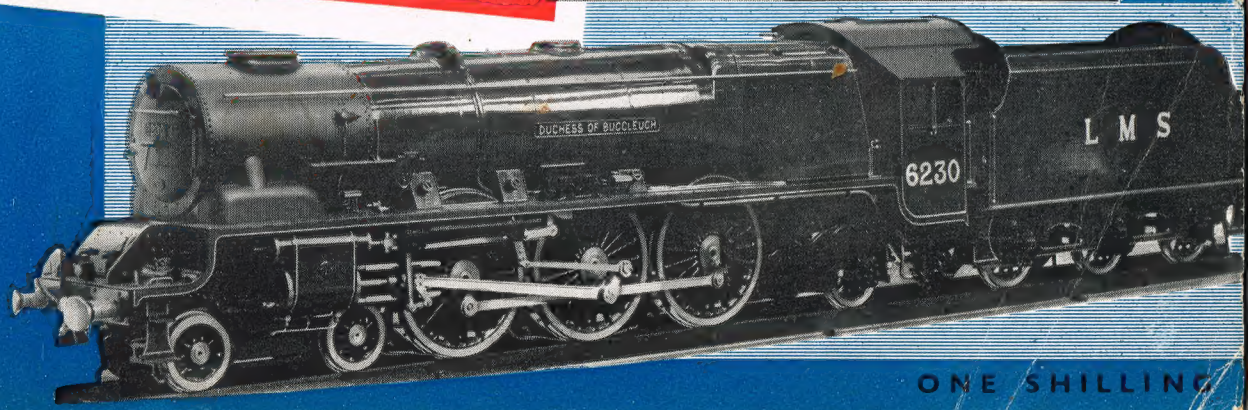

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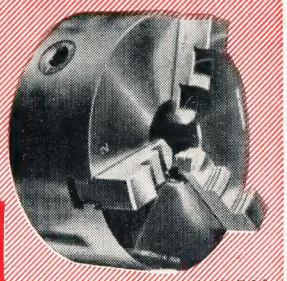

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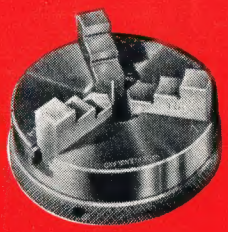

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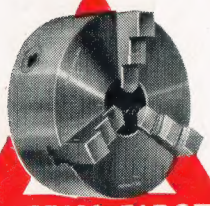

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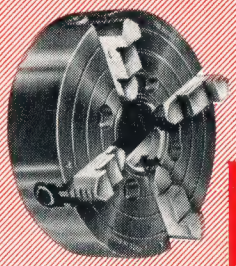

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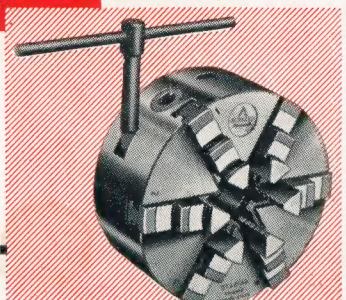

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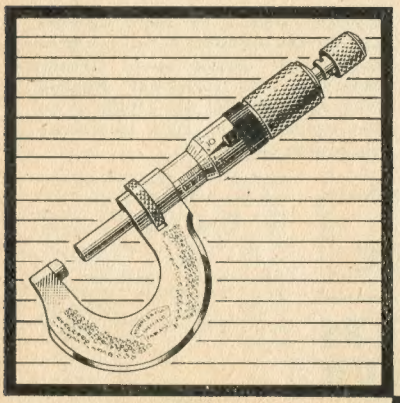

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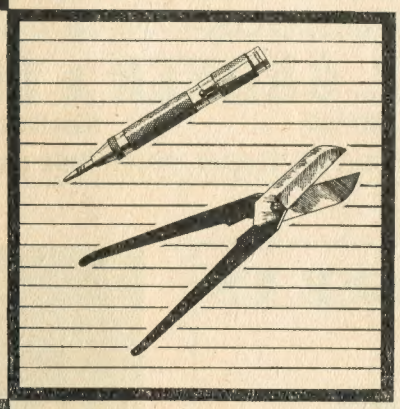

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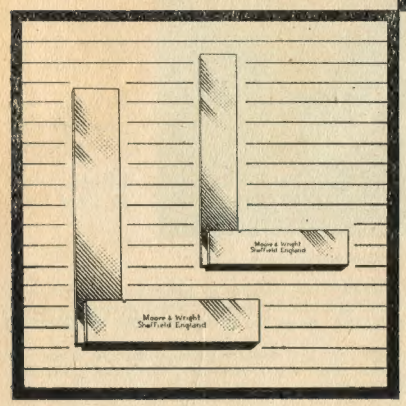

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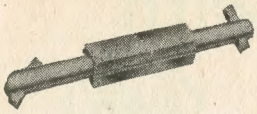

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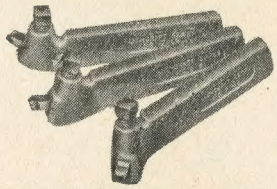

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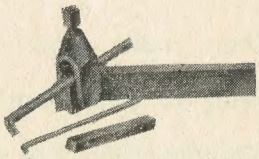

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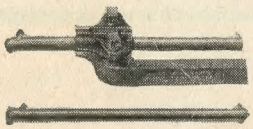

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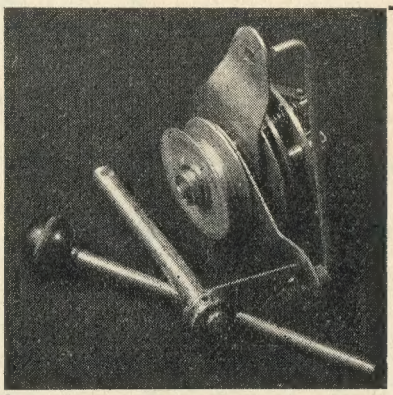

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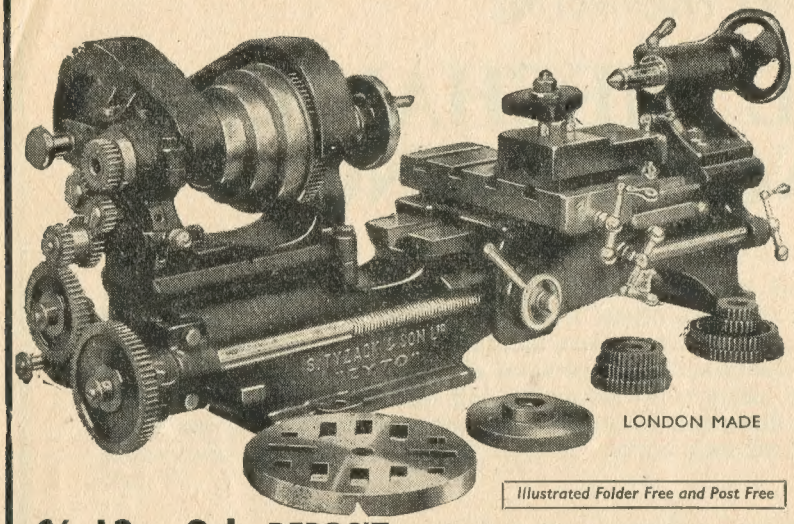

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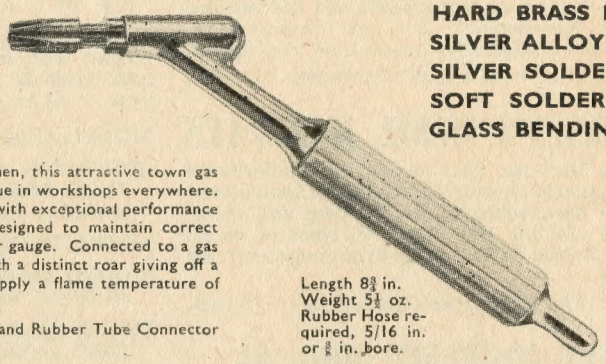

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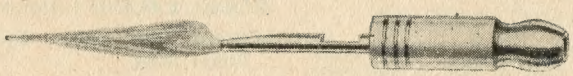

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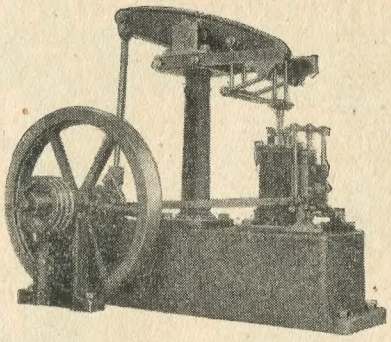

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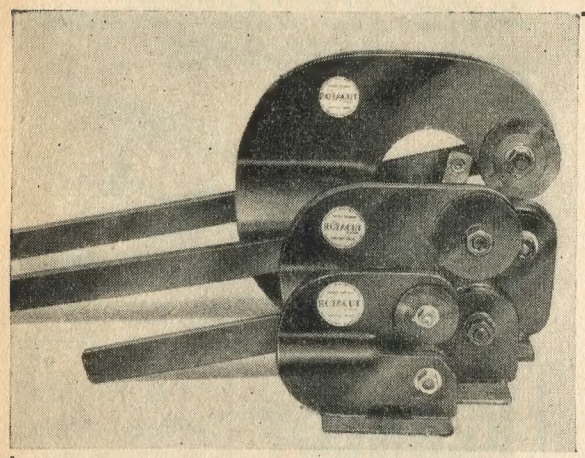

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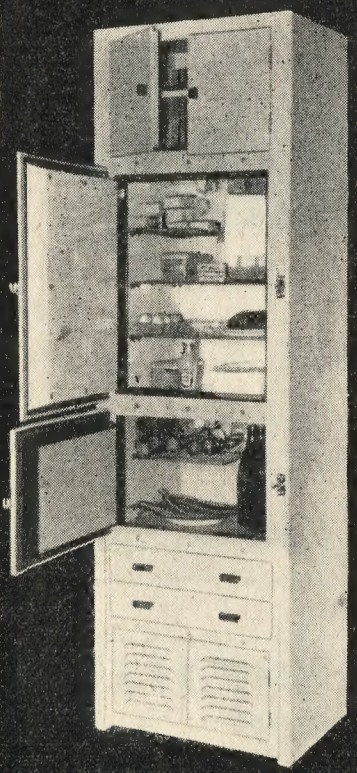

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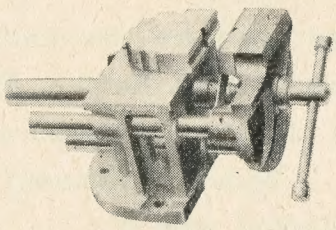

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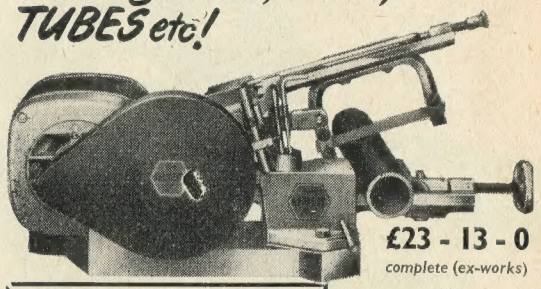

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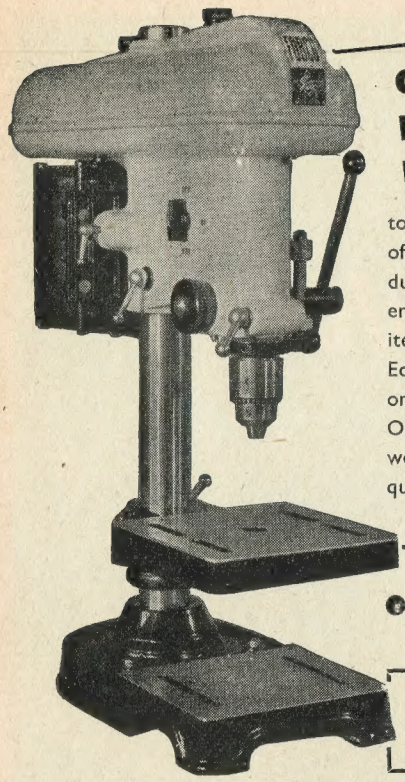

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Model Engineer

ONE SHILLING 22 AUGUST 1957 VOL. 117 NO 2935

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Smoke Rings

A WEEKLY COMMENTARY BY VULCAN

LORD Northesk, who officially opened this year's Model Engineer Exhibition, can trace his association with models back to pre-first world war days, when he was presented with a clockwork locomotive, some coaches and a length of oval tinplate track.

This layout, he tells me, was supplemented from time to time until he had quite an extensive collection of locomotives and other rolling stock, the prime mover still being clockwork.

A change of residence in 1921 gave Lord Northesk the chance to rebuild his model railway, using Lowko track and adding some wooden coaches.

Then, in 1930, he "went scale" with precision built permanent way, which he constructed himself. This paved the way for a collection of scale coaches and wagons with full detail, some of which he built himself, and he even tried his hand at building an 0 6-0 tender engine, but the result, he confesses, was "pretty bad."

Nil desperandum!

However, later efforts at model locomotive construction, both coal-fired and electrically driven and all in gauge 1, were better and he still cherishes the ambition that he will one day build a "fairly good model."

It was in 1934 that he was elected a member of the SMEE and in 1937 he became its president and held that office until 1945. Again in 1951 he was elected president and has retained the office ever since.

Lord Northesk's prime interest is in railways, with ships coming a close second. He observes:

"As long as I can remember I have always had a love of railways in all their aspects, and my first loves were the old LSWR and GNR, by which companies I travelled two or three times a year in my youth between the family's homes in Hampshire and Scotland.

"I have always been a lover of steam and, while appreciating the necessity for electric and/or diesel traction, I look forward with profound sorrow to the last days of steam on the railways of Britain.

"This explains my love for the Talyllyn Railway, of which I am chairman, and makes me and my colleagues determined to keep this little railway in steam for posterity."

I am sure that these are sentiments which our readers will heartily endorse.

Initiative

I LIKE the enthusiasm and initiative of Mr H. Plastow, of Enfield, who, seeing two steam traction engines while on holiday with his brother in Devon, made a successful bid for the purchase of one.

After effecting some repairs—retubing the boiler, fitting a new smoke box, chimney and high-pressure injector pipe—Mr Plastow decided to drive the old steam tractor from the

Smoke Rings . . .

West Country to the big traction engine rally at the Duke of Bedford's estate, Woburn Abbey, on Bank Holiday Monday.

Mr T. Moore, the former owner of the engine, volunteered to launch Mr Plastow and his brother on the first leg of the journey by conducting them as far as Taunton. After that the brothers intended to take over, driving by day and camping by night, the latter proving no hardship to them as they are both in the Scout movement.

In fact, after the Woburn rally the engine will be driven to Enfield for an overhaul and refit, then it will be used at Scout fetes to help raise funds.

A perfect way of satisfying two diverse interests.

Surprised the Duke

The unsuspected popularity of the steam traction engine made the Duke of Bedford "eat humble pie,"-according to a report in the *Manchester Guardian*. To his utter astonishment 20,000 visitors crowded into the park to watch these vintage engines go through their repertoire.

"I have eaten humble pie," the Duke told one newspaperman. "I never thought these engines would draw such a crowd although the National Traction Engine Club secretary (John Crawley) said they would."

The Duchess rode beside the Duke on Crawley's 1920 Fowler showman from the arena to where the massive oldtimers were entertaining the crowds with lumbering races.

So pleased was the Duke that he presented £10 to the owner of each entered engine and in addition 5 cwt of coal.

Innocent offender

SOMEWHERE on New Zealand's South Island a young man saved up his cash and bought a beautiful quarter-inch electric drill. He also saved up plenty of jobs for the drill to do, and on the very next Saturday afternoon he was a busy young man as well as a happy one.

But his workshop was about 40 ft from the house, and to provide power for the drill he used at least 50 ft of three-core flex. Later that evening, while still happily at work, he discovered (says *The Connecting Rod* of the Otago MES) how popular he was. Every time he switched on his drill the long flex acted as an aerial and upset every radio in the district.

I wonder how often this kind of thing happens ? It would be interesting to hear some more stories of men who have been innocently occupied in the workshop while their electric current drove their neighbours frantic.

International Regatta

THIS event, held at St Albans during Bank Holiday weekend, was the largest and most successful gathering of its kind ever held in this country.

Lord Northesk, president of the SMEE

Cover picture

Philip Hailstone (8) *and his brother Richard* (10) *show great interest in Sydney Harris's model of a Fowler road locomotive. Complete to even a working model dynamo, this engine is valued at* £3,000. *Below is Cyril East's model of the* 4-6-2 DUCHESS OF BUCCLEUCH

Continental support was excellent, both in quantity and quality; although the expected Italian contingent failed to arrive, a total of eight competitors from Paris, Bordeaux and Brussels gave adequate representation, and it is worthy of note that the first and most famous of all French enthusiasts, M. Gems Suzor, was among them.

The maximum speed attained was below that of last year, but average performance was higher than ever, and top places were closely contested. Ken Hyder, of the home club, achieved the highest speed, 68.7 m.p.h., with *Slipper* 5, but this was only a few decimal points above that of a French boat; several competitors were well above the mile-a-minute figure.

A fully detailed and illustrated report of the regatta will be published in a later issue.

Train to catch

AT a Model Engineer Exhibition a year or two ago a visitor was bemoaning the fact that he had to leave early in order to be on the 9.10 p.m. from Euston.

"But why can't you travel by a later train ?" asked a steward.

"No, I can't do that," replied the visitor, non-committally.

"But surely there must be a later train than the 9.10," suggested the steward, helpfully.

"Oh, yes, there is," answered the visitor, and fell into a short silence. Maybe he wants to be home in time to catch the morning train back so that he's here by the time the Exhibition opens again in the morning, thought the steward, whimsically.

Then the visitor explained. "I can't very well miss the 9.10," he said. "I happen to be driving it ! "

Footnote

THE most unusual model entered to date is "A dream on the Night of March 9, after eating cheese." It is a model of "Little Men in a Case," measuring 12 in. × 8 in. × 8 in. and weighing 4½ lb. Value of it is £25.

Designer of this unique exhibit is Michael Oxley, a part-time gasman of West London (he canoes to his workshop through Pitshangar), who says he built it to the low scale of 1 toe to 1 ft.

Joseph Martin introduces you to some of the ATTRACTIONS in the Jubilee Year

ONE of the most popular curiosities at the first Model Engineer Exhibition half a century ago was a phrenometer, or electrical phrenologist, for reading the visitors' bumps.

Precisely how one identifies a bump for modelling—when one has found it—was not explained, and perhaps this secret has died with phrenology itself. What we know is that the visitors, including "many well-known model engineers," did not flinch from the truth about themselves as recorded on a card by this rather terrifying machine. Some of them had already learnt about Lavery's Electrical Phrenometer from an illustrated article in these pages, and the Exhibition found them removing their bowlers and toppers for the inspection of its "remorseless fingers."

Those who visit the 1957 Exhibition will have to go away, I am afraid, with their bumps still unread. There is, however, so much else at the New Horticultural Hall to please, interest and help them that I doubt if they will think themselves any less fortunate than their fathers, grandfathers or own younger selves back in 1907 when Edward was on the throne.

Until somebody thinks out an original way of saying "Good morning," I am content to declare that the 1957 Exhibition has "something for everybody." The dead phrase comes to life. There is something here for the old, who will bring with them a forgivable prejudice in favour of the past, and for the young, who find the present never so exciting as when it points bravely to the future. Even the mothers and sisters who have been cajoled or bribed will admit their pilgrimage well repaid.

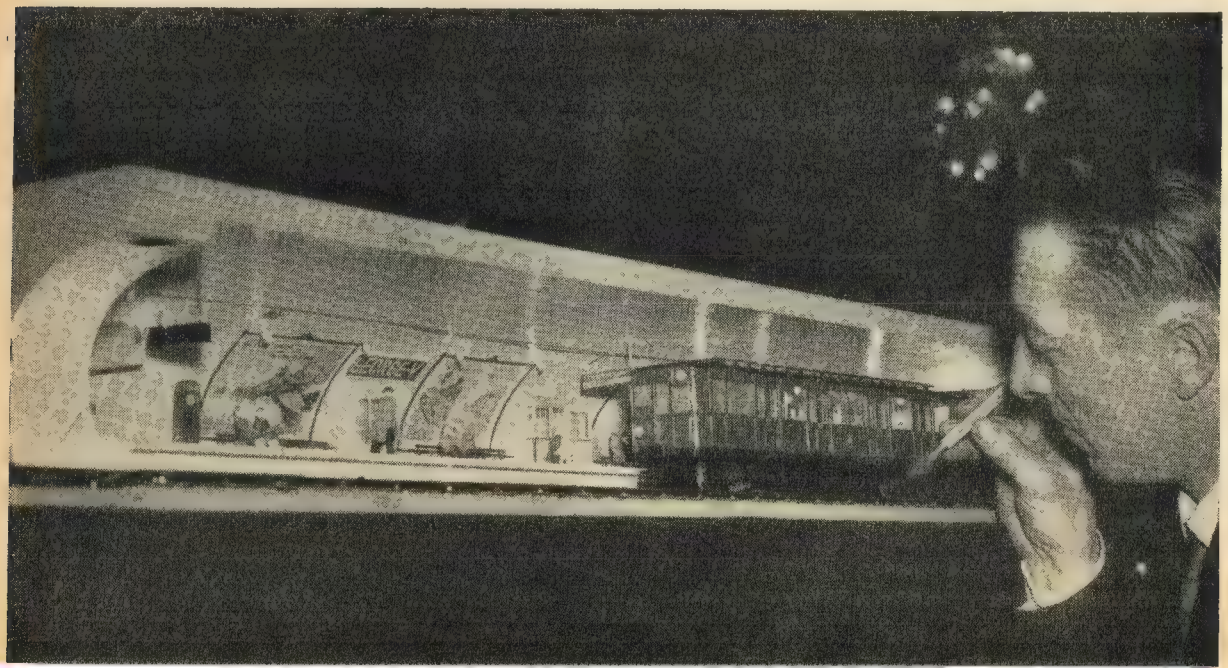
The familiar exhibits can, for the present, be taken for granted. Among the special attractions the most popular is bound to be the magnificent model of the Paris Metro presented to the Queen for Prince Charles during the Royal visit to France in April. For graciously lending it to the Exhibition and allowing it to be demonstrated there, Her Majesty will have the thanks of the modelling movement as well as of innumerable fascinated small boys.

Two coaches of cast-bronze, one first class and the other second, run on eight metres (or about 26 ft) of double rail with a live rail at the side, the traction a.c. supply being 220 v. through a transformer. The train calls at two stations, the Hotel de Ville and George V, and when it arrives the platform gates open and close automatically.

Altogether, in study and labour, 350 man hours went to the building of this model. The craftsmen who worked on it were confronted with snags as tricky as any which come the way of their fellow modellers. They had, for instance, to devise a means of operating the gates when the side rail was needed to light the train in the station. And how were they to prevent them from closing again too suddenly? It took 15 days of testing to perfect the precision work on the door mechanism.

In the end these patient modellers had, for their labours, an undoubted masterpiece. The coaches, which make a train 74 cm. long, are beautifully wrought, with seats and lights inside, and the stations are complete to such details as maps, fire-fighting equipment, coloured advertisements, illuminated chocolate and weighing machines, and wastepaper baskets for used tickets. In short, the model Metro is everything one would expect of a present made especially for the heir to the throne.

The Metro station George V receiving a final check-over before being presented to the Queen for Prince Charles recently



From the SMEE passenger track to the small-gauge layouts, the show has all that the railway enthusiast would desire. One of the new attractions is the Maryville, Fredericton and Westbury Railway on which F. A. Barratt of Chingford and District MEC has been occupied in his spare time for the past 15 years.

It is of special interest for two reasons. First, Mr Barratt uses only a kitchen table and the simplest tools, thereby providing encouragement for the humblest beginner. Secondly, he has taken tremendous pains to fit his layout into an authentic setting, a trend which is becoming increasingly marked among miniature railway builders. Here we have not only a railway but the local world that it serves. People shop and queue for buses, and we have a feeling of life going on day by day while the cathedral looks down on it all in the poised calm of timelessness.

Very different, I need hardly add, is the Oyster Creek Railway, another appreciated contribution from Chingford. Anthony Jacobs and Barrie Deamer have based their model on the famous Emett Railway in the Royal Festival Gardens at Battersea. Emett's *Nellie*, running electrically on 16.5 mm. three-rail track, has been built up from a Hornby chassis. Besides being amusing, the layout shows what can be done with paper, thin card and patient care. Mr Jacobs and Mr Deamer are both busy members of the BBC, one in films, the other in still-photography, and they built their railway (it measures 11 ft × 2 ft) in a mere three weeks.

Signalling

Of general as well as technical interest is the model layout designed to illustrate modern multi-aspect power signalling in which, as the name suggests, the signal can give the driver more than two indications. Double yellow, for example, means " Proceed —prepare to pass the next signal at restricted speed."

The domino control panel is full-sized and exactly as one would find it on the Western Region of British Railways. It depicts diagrammatically the whole extent within its territory, and every possible route is defined at one end by a signal switch and at the other by a push-button; hence the name for this system of Entrance-Exit.

Running on 14 ft of double line O gauge track with seven colour-light signals, two position-light shunting signals and power-operated points, two locomotives move about in response to the control panel. The public will welcome the model as an assurance that the safety tradition of the old GWR is being respected by the Western Region of today.

British Railways also send a full-size signal; a three-doll double-bracket semaphore with long-burning oil lamps and electrical devices to repeat the lights and arms inside the signal box. It weighs three quarters of a ton.

Still another signalling system comes from a private modeller, S. M. Pearce, of Sutton, whose signal cabin has 27 interlocking lever frames. Outside is a length of track with crossover and points and level crossing gates which are opened and shut from the cabin. The model measures 5 ft × 3 ft and is part of a layout that will continue to grow.

Treasures collection

Every railway lover visiting the show is sure to be pleased by the Transport Treasures collection from British Railways, not only because of its intrinsic interest but also because it proves that the Commission is not forgetting the past in preparing for the future. With generous help from private individuals—among them, no doubt, readers of ME and *Model Railway News*—the collection already contains thousands of treasures. The display at the Exhibition, though it occupies two stands, represents only a tiny part of the full trove.

Staunch as ever in the support of live steam are the members of the Society of Model and Experimental Engineers. The SMEE passenger-carrying track can be called a special attraction: it is always there and it is always special. If I pass by the details of the society's contribution to the 1957 array, the reason is that its excellence can be anticipated.

Long experience has taught the modelling world what to expect of the SMEE. This distinguished society in London, this journal which you are reading and the organised modelling movement throughout the English-speaking lands have all grown up together. SMEE locomotives were running at the first Model Engineer Exhibition, when many present had never before seen a model railway engine moving under power of steam; and we all hope that they will be going strong in 50 years' time when the Exhibition celebrates its centenary.

Like modelling itself, the Exhibition draws strength from variety. Quite in contrast with locomotives and railways of any kind, we shall find at the New Horticultural Hall this year the ME Musical Clock made by C. B. Reeve. The clock won the Bradbury-Winter Challenge Cup in 1952 and has been going ever since, apart from a short interval when Mr Reeve took it to pieces to make the drawings for his series of articles [ME, 1956 to 1957]. In 1952 its chimes were broadcast by the BBC, an honour that falls to very few clocks smaller than Big Ben, and this year they will be clearly heard in the hall over the public address system.

Yet another contrast is provided by a figure-of-eight layout on which some first-class diesel racing cars will be running at speeds as high as 30 m.p.h., the scale equivalent of 300. The track belongs to the North London SME and the demonstrations are organised by the Model Rail Car Association, whose members in all parts of the country have been invited to bring their cars. All being well, there should be 15-minute demonstrations every hour.

Everyone who has visited the exhibitions held in Manchester by the Northern Association of Model Engineers knows that they have a place for all kinds of modelling and that the work put forward displays a quality worthy of the North. The NAME stand brings together a selection from the best of this work so that the South can conveniently see what the North is doing.

Modellers will also be there from the other side of Offa's Dyke, for the South Wales and Monmouthshire Federation of Modelling Societies is host this year to the clubs represented at the usual conference on the last day.

Model aircraft

Both in Wales and the North there is, as I well know from my travels, great enthusiasm for constructing and flying model aircraft, and if ever you spot anything odd flying over the civic buildings in Cardiff or Manchester it is probably not a flying saucer at all but a local model doing its stunts.

No one who shares this interest, which is growing fast everywhere from Newcastle to New Zealand, will want to miss the Royal Air Force display of two high-speed modern jet fighters. The scale models are real jets driven by compressed air. Taking off from a circular runway, they fly independently at varying speeds in a 30 ft circle. A tape recording cleverly synchronised with the flight reproduces the normal communications between aircraft and control tower on an RAF station.

The aeronautical and others besides will appreciate the Vickers stand. Here are shown a working model of a wind tunnel, with tunnel aircraft, and a large-scale model of the *Valiant*, an aircraft that is proving one of Britain's best advertisements this side of the war. Everyone who works for Vickers can feel proud of belonging to that ever-expanding, ever-questing organisation, and I hope that all the young visitors will see the films which are to be shown on the theme of

Western Region (BR) colour-light signal layout

careers and apprentice-training in the Vickers Groups.

On the same stand the ship modellers —by whose graceful craftsmanship the Exhibition is again enriched—are able to see something of what Vickers are doing on the wave.

Britain's National Physical Laboratory, of which you may have read recently in these columns, is largely occupied with mysteries, some of which are made still more mysterious by the peculiar language of scientists. You will see at the New Horticultural Hall a model showing "the photo-elastic stress analysis of a suitable component," and when you have seen it you will probably know what this means. Far from being remote from everyday life, the NPL in fact touches it at almost every point, and its brilliant work in the service of the entire public cannot be too highly praised.

Another public institution to co-operate is the GPO. Its model of a mobile post office was made, accurately to scale, by the motor branch of the Post Office Engineering Department at Yeading, in Middlesex, and you are certain to like it even if you can no longer afford to post a letter !

The Exhibition would not be itself without continuous demonstrations of one kind and another. As in former years, radio-controlled vessels will be curving through the water while aircraft overhead obey a similar form of control. This is always a big occasion for the International Radio Control Models Society and we shall meet some of its leading members at the pole.

No radio-control modeller is more widely known than George Sommerhoff, the analytical biologist and grandson of Robert Schumann, the composer. Besides being a master of radio control in model aircraft, he is sensationally clever in his radio manipulation of boats. This year he hopes to bring three or four of them and to stay a week. The best, he says, will launch a clockwork-driven lifeboat, fire a lifeboat, fire a jetex-propelled torpedo and, perhaps, for good value, throw a line ashore.

D. R. Richards, our familiar brigadier, will again be supervising the demonstrations of workshop practice and modelling techniques. So attractive is this aspect of the Exhibition that the demonstration area has been made bigger and better, with very much improved opportunities for the public to watch the work in progress.

Ship modeller at work

As well as showing how an expert makes his sails and rigging for a period ship, J. T. Brittain will cut out paper patterns to stated requirements and give them away. It will similarly delight lovers of old ships to find R. J. Collins at work on *Myrmidon*, the ship-rigged sloop of 1781 which many readers are building with him; and he will, of course, be glad to advise them on any problem within his scope.

Although we shall have to go away with our crania uncharted and undocumented, there will be plenty in Puzzle Corner to exercise whatever is inside them. Several famous companies contribute to this enthralling section: Mullard with the disappearing ball which vanishes as soon as you try to grasp it, Phillips Electrical with with the echo well which repeats almost instantly anything that is said to it, and Siemens with the noughts and crosses machine.

The secret of all this magic resides in one word: electronics. Fifty years ago visitors to the Model Engineer Exhibition were fascinated by the new uses of electricity at that time. They delighted in dynamos, accumulators and radio—and now they have, in electronics, one of the most exciting sciences of a later age.

The model engineering movement has kept alive through all the years by embracing the new while it honours the old, and the 1957 Model Engineer Exhibition shows it ready in this spirit for the changes and adventures of another half century.

With the renewed warnings from health authorities in Britain and the USA of the dangers in cigarette smoking, we are becoming more conscious of the purity or impurity of the air that we breathe. Topical interest, therefore, attaches to the Precipitron electrostatic air filter designed and manufactured by the Sturtevant Engineering Company of Southern House, Cannon Street, London.

The unit on view shows how tobacco smoke, or other suspended matter—from disease germs to fog—can be completely removed from the atmosphere. Ionising wires charge every particle with electricity and the particles are then deposited electrically on plates until they are washed off by a water spray.

Precipitron offers us cleaner breathing in an age when the air around us is, ironically, polluted as a circumstance of progress. ▣

What to see at the ME Exhibition

This model of an F-100c Super Sabre is covered entirely with silver paper

A preview of some of the models that will be on view at this year's show

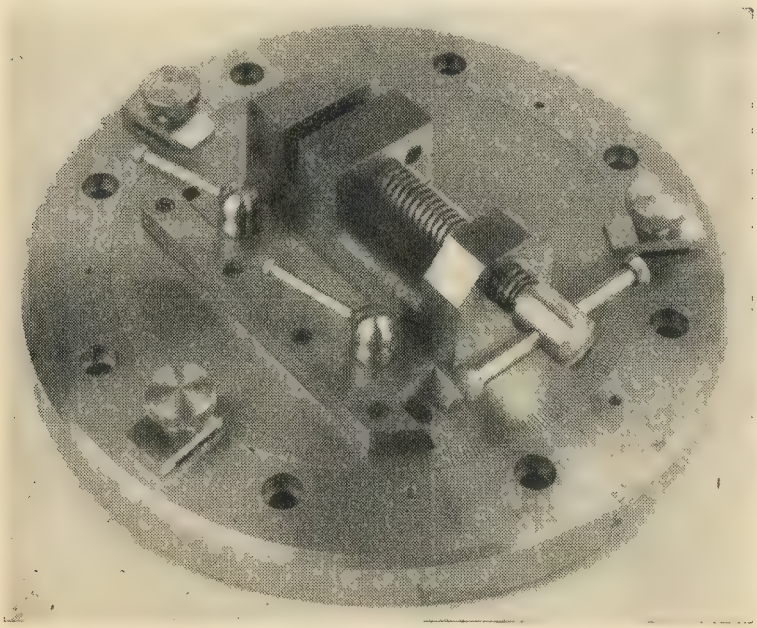
GENERAL ENGINEERING SECTION

FURTHER entries of working model steam engines have now been received, including a free-lance beam engine to an approximate scale of $\frac{1}{2}$ in. to 1 ft, by J. A. Elliott, a machine tool fitter, of Dagenham, and a Grasshopper type beam engine, by A. M. Donaldson, mechanical engineer, of Holloway, N7.

Both these models are of fabricated construction, and designs are based on information published in the ME. A free-lance single-cylinder engine, $1\frac{9}{16}$ in. bore × $2\frac{5}{16}$ in. stroke, is entered by H. M. Webb, aircraft engine designer, of Bristol, and a $1\frac{1}{2}$ in. scale horizontal condensing engine, with Greenly valve gear and throttle governor, by a well-known ME contributor, K. N. Harris, of Rustington, Sussex.

IC ENGINES

L. J. King, motor engineer, of Bristol, has entered a 1 in. scale working model of a Coventry-Climax trailer fire pump, the power unit of which is a 5 c.c. water-cooled two-stroke engine which develops 0.075 h.p. at 9,000 r.p.m. A supercharged 15 c.c. split-single two-stroke engine, of original design, intended for use in a racing hydroplane, is entered by C. R. F. Hewlett, a medical practitioner, of Kings Lynn, and a 30 c.c. single-sleeve valve engine by G. D. Noble, a well-known veteran exponent of model speed boats, of Bristol. W. Cruddas, of Sunderland, exhibits an example of the Seal Major 30 c.c. four-cylinder engine, with modified details.



A rotary vice designed by student apprentice Keith D. Wayte

MECHANICALLY-PROPELLED VEHICLES

Several scale models of popular types of cars and motor-cycles appear in this class, including a 1/20 scale Cadillac and a Lincoln Futura by L. J. Brock, of London, SE21, a Harrington motor coach to a scale of $\frac{1}{16}$ in. to 1 ft by E. Maynard, of Hove, a D-type Jaguar and a Ferrari racing car by U. Perilli, of London, SW9, and a D-type ERA racing car by S. Rapson of Worksop, Notts. Three exhibits, comprising a Norton Manx racing motor-cycle, a Norton 600 c.c. combination, and a Triumph Thunderbird twin, are entered by H. W. Hooper, of Birmingham, a well-known specialist in models of this type.

An example of the ME Aveling type i.c. road roller is entered by W. T. Eridge, a carpenter, of Staines, Middlesex, who states that its construction occupied two years' spare time; the only parts purchased were the gear wheels.

MODEL RACING CARS

Several model cars intended for competition work are entered by members of the Miniature Motor Sport Club, including a $\frac{1}{16}$ scale twin-cam Austin by T. H. Toogood, of N Cheam; a Grand Prix Lancia-Ferrari in $\frac{1}{16}$ scale by R. S. Brown, of Wimbledon; a 1/12 scale Austin-Healey by E. W. Thomas, of Ealing,

and a 1/12 scale motor cycle combination by L. Kirby, of Wembley.

TOOLS AND EQUIPMENT

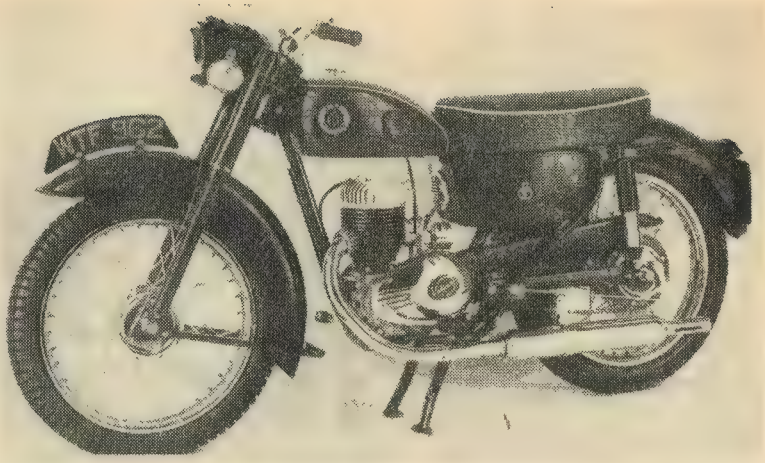
A well-known exponent of ornamental turning, John A. Pickles, of Barnoldswick, Lancs, exhibits a spherical slide rest, geometric chuck and universal cutter frame, designed for carrying out the intricate operations in this class of work. W. Richmond, of Newcastle upon Tyne, has entered a hack-saw machine of original design, with a work capacity of 4 in. dia.

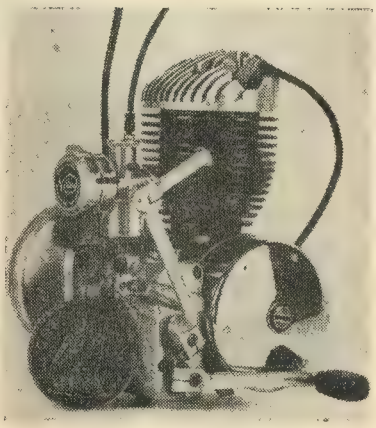
Two items of equipment which have seen practical use in the workshop are exhibited by R. W. Mason, of Clevedon, Somerset, namely a dividing head, with two division plates, for a Little John lathe, adapted from a commercial design and castings, and a tool grinder for carbide-tipped tools, for use with a Target grinding jig.

Several apprentices and students outside the age limit for the Student's Cup Competition have entered items in the tool section. These include a watchmaker's lathe, a vernier height gauge, and a radio calibration instrument by P. Wookey, of Harlow, Essex; a self-adjusting vice by M. P. Try, of Frimley, Hants; a rotary vice by K. D. Waite, of Harefield, Middlesex; a universal vice by D. P. A. Gibson, of Ruislip, and a comparator stand by R. W. Davis, of Camberley.

SCIENTIFIC INSTRUMENTS

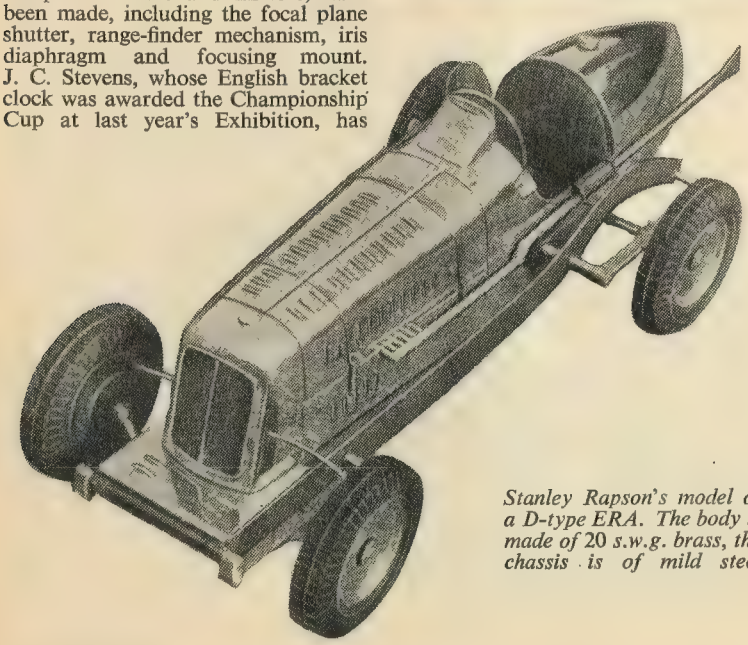
A 35 mm. camera, based on published drawings and information on the Leica camera, is exhibited by F. J. Newcombe, a cigarette machine operator, of Bristol. All parts, except the lenses and mirrors, have been made, including the focal plane shutter, range-finder mechanism, iris diaphragm and focusing mount. J. C. Stevens, whose English bracket clock was awarded the Championship Cup at last year's Exhibition, has entered a working model of the now obsolete Duplex watch escapement.





Above: Eight hundred hours' work went into the making of this model Francis Barnett by Leslie Tatlock. It is equipped with 6 v. lighting

Left: The model of a Villiers engine fitted to Mr Tatlock's motor-cycle



Stanley Rapson's model of a D-type ERA. The body is made of 20 s.w.g. brass, the chassis is of mild steel

LOAN SECTION

Apart from exhibits which have already been mentioned in earlier reviews, this section includes a collection of steam engine models by E. J. Howlett, of Highgate, N6, comprising two beam engines, a side lever engine, a table engine, examples of single-cylinder and twin-cylinder overhead-crank vertical engines, and a combined engine and boiler.

Some interesting experimental engines are contributed by C. C. Brinton, of Bellbroughton, Worcs., including a twin petrol engine of 1¼ in. bore × 1⅞ in. stroke, a single-sleeve valve petrol engine, a two cylinder opposed-piston steam or compressed air engine, and a two-cylinder oscillating air pump which was designed, and successfully employed, for administering anaesthetics in surgical practice.

Ship models in this section include a ⅛ in. scale Thames spritsail barge by H. A. Bower, of Bromley, Kent, a 50 in. cabin cruiser by G. W. Fitzgerald, of London, SW11, and six miniature ships in electric light bulbs by J. Street, of Kingswood, Surrey.

R. W. Mason, of Clevedon, exhibits an unfinished engraving machine, based on the ME Duplex type with certain modifications. A 1/12 scale model of a horse plough of the Sussex " turnrise " type, now obsolete, is exhibited by A. Ford, of Welwyn Garden City, Herts. Several pupils of Tyler's Croft School Model Engineering Club have entered unfinished model steam engines, mostly based on

What to see at the ME Exhibition . . .

the Stuart No 10 and made in the school workshop.

LOCOMOTIVES

A 5 in. gauge engine that is fairly certain to attract attention is a model of a well-known Lancashire and Yorkshire 0-6-0 designed by Aspinall and built at Horwich in 1889; the model was built by L. R. Raper, of Manchester, who says it has pulled 2,000 passengers in one season.

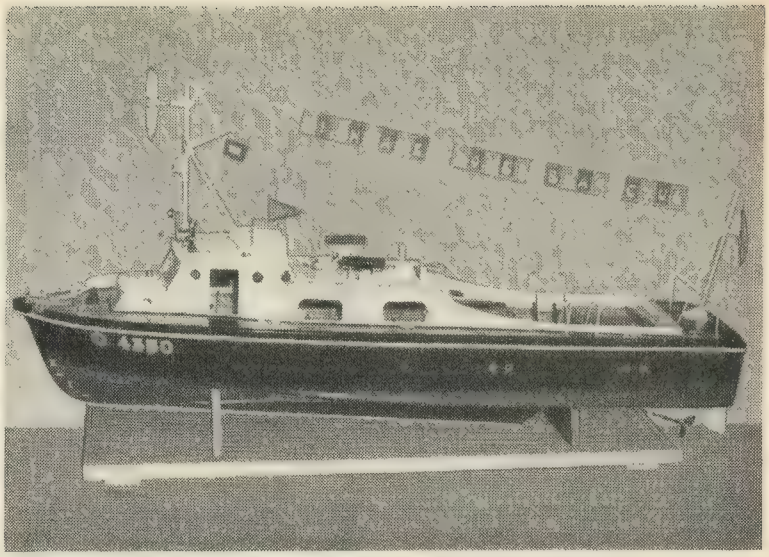
This is evidently one more demonstration of the fact that a model of an old time prototype can be a thorough success, especially if it is an 0-6-0. Mr Raper obtained all necessary information from official drawings supplied by British Railways, and he says that the only parts he did not make are the pressure gauge and the numberplates.

Another popular oldtimer will be recalled by a 3½ in. gauge Great Western 4-4-0 engine, *Camelot*, made by K. J. Webber, of Cheddar. The prototype was one of the well-known Bulldog class which did such good work, for so many years, all over the GWR. The only castings used in the model were the wheels. The cylinders, horns, springs, axle boxes, etc., were built up. The model has worked on tracks in and around Bristol since 1950.

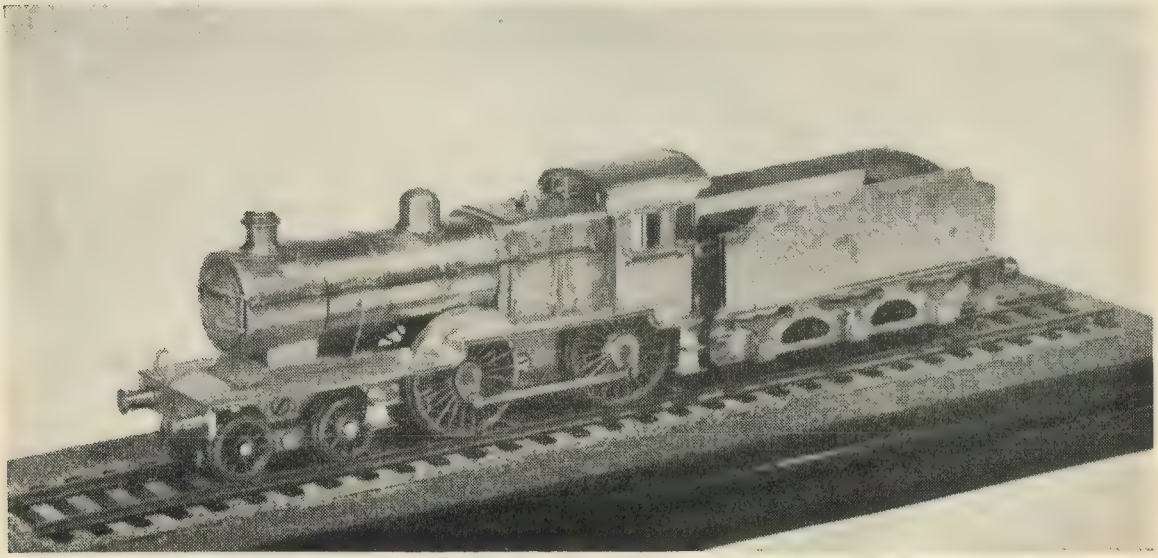
M. V. Street, of Weston-super-Mare, has sent in a 1½ in. scale model of a Lynton and Barnstaple 2-6-2 tank engine; it was built from the drawings published in Catchpole's *History of the L and BR* and it weighs approximately a hundredweight.

A reminder of the *Titfield Thunderbolt* is a ¾ in. scale model of the old *Lion* of the Liverpool and Manchester Railway, made by F. F. Few, of Hatfield. The model was started to LBSC's design, but the builder soon realised that it would be lacking in essential details; therefore, drawings and photographs were obtained from British Railways and the model was accordingly modified, though the motion, cylinders and boiler remained practically unaltered. The tender was completely redesigned in an effort to "catch the atmosphere" of the prototype.

Two further entries hail from the Bristol area; first a ¾ in. scale GWR 4-6-0, *County of Devon*, by D. B. L. Collins, which has done much work during the last four years; the other model is an experimental i.c. shunting engine by B. W. D. Harris, of Nailsea; it is fitted with a 65 c.c. engine for testing purposes. ▣



A scale model of an RAF range safety launch built by Bertram P. Webb. It is powered by an electric motor and has ten miniature working lights



Leslie Brown's 4-4-0 *Southern Railway class L1 before painting*

BEGINNER'S WORKSHOP

Flexible couplings

By GEOMETER

A FLEXIBLE coupling can be the means of transmitting drive directly between shafts whose perfect alignment is desirable but difficult or impossible to ensure; or it can serve the same purpose of transmission while taking on the functions of a universal joint—when the coupling is in duplicate, one at each end of a shaft connecting two other shafts that are out of line, or the angle between which varies. A flexible coupling may also provide for easy assembling and dismantling.

An example of the use of a coupling as a flexible device in transmission is where a motor or engine is mounted on a bed plate to drive a pump or generator in line; the coupling then accommodates a small degree of malalignment. An example of the function as a universal joint is to be found on many older cars, where a coupling at the rear of the gearbox transmits drive to the propeller shaft, and another coupling at the rear axle takes the drive from the propeller shaft to the pinion driving the crown wheel.

An example of providing for assembling and dismantling is on old type Morris Minor and MG engines, on which a flexible metal coupling transmits drive from the vertical dynamo to the overhead camshaft; taking out two bolts from the coupling releases head and valve gear from the drive.

In addition, a flexible coupling absorbs some shock and requires no lubrication—and, should it be necessary, can without difficulty be made in model sizes.

A typical coupling *A* is a rubber-and-canvas ring with six holes whose ends are protected by riveted metal plates. Each shaft carries a three-armed " spider " *B* and the coupling is bolted between these, as at *C*. The bolts should be a good fit—the nuts pulled up firmly, but not to squeeze the coupling unduly—and split-pinned.

The spiders on the shafts should permit the coupling to lie centrally between them, without drag; and on an engine-pump installation it is a good plan to loosen the pump and retighten with the engine being turned for the drive to align itself.

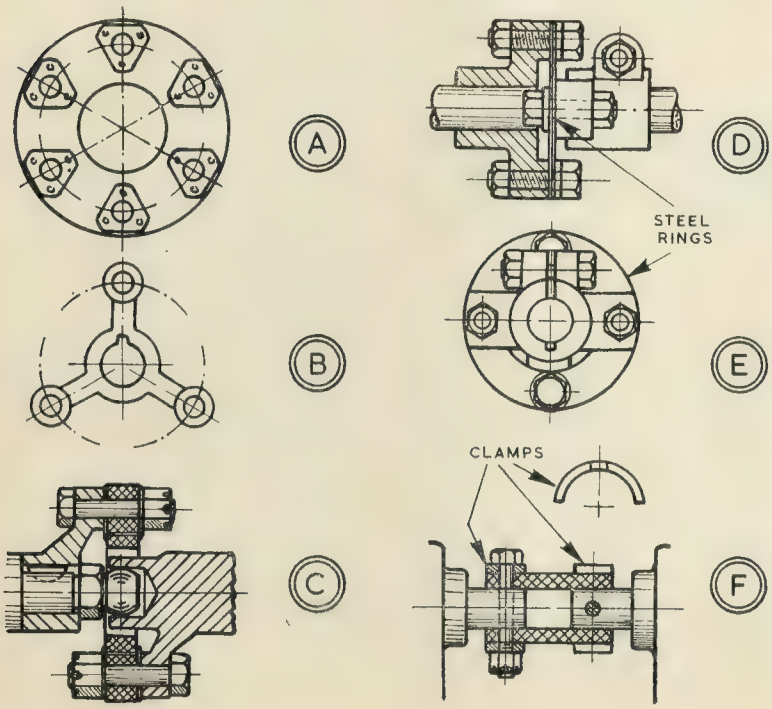
Important points on a spider are that the bolt holes must be on the same pitch circle, and the faces of the bosses rotate in the same plane. Checking these only requires a scribing block or fixed pointer, and that the shaft carrying the spider be turned. Malalignment may result in rapid deterioration of the coupling, but a faulty spider can sometimes be corrected by bending and/or filing.

Equally important where the coupling serves as a universal joint is that it should be relieved of the function of actually centring the free shaft—the propeller shaft on a car. Without some centring means, true running of the free shaft is dependent on the accuracy of the spacing of the holes in the coupling—which in rubber and canvas may well not be maintained, particularly when the coupling is flexing. Then a wobbling shaft can set up heavy vibration.

Centring can be provided by a ball-ended nut or screw for one shaft, and a plain bore on the other fitting over the ball *C*. Alternatively, a flanged plate may be mounted on the spider on the free shaft to fit over the ball. Correct assembly is essential, but not all shafts are provided with this desirable feature.

Instead of rubber-and-canvas, a number of thin steel rings can be used for a coupling *D* and *E*. Four equally-spaced holes admit of bolting to a yoke on each shaft—and often one of the yokes is keyed and clamped for endwise setting. Shafts for this type of coupling must be reasonably in line or their speed of rotation low otherwise the rings would fail by cracking.

A very simple coupling for light duty, possessing both torsional and axial flexibility, is a piece of rubber-and-canvas hose secured to each shaft *F* by a bolt and two semi-circular metal clamps. ▣



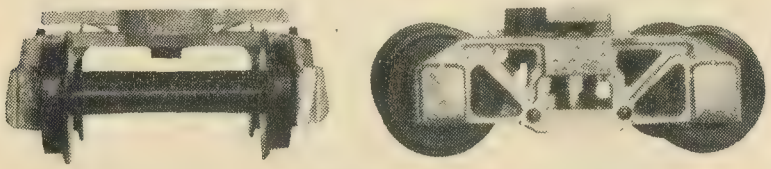
TRADE STANDS

JOSEPH MARTIN invites you to join his 'conducted tour' — invaluable to all intending visitors to the Exhibition

STEAM models and strip lighting, fire safes and a four-speed lathe, typewriters and a time recorder, a sink guard and a short distance motor-cycle, washers and wireless telegraphy, photometers and parts for *Precursor*, Johannson gauges and jointed toys, motor-boats and a matchbox, ballasted track, beds and a baby carriage, gadgets for gramophones —these were some of the things shown on the trade stands at the first Model Engineer Exhibition.

If we do not find all these articles on view today—and certainly not the beds and the baby carriages—we still have much the same variety. The trade stands in 1957 complement the exhibits proper in illustrating the range and richness of model engineering.

One of the most interesting stands in 1907 was Stuart Turner's. This Henley-on-Thames company, already well known even at that time, was showing castings and finished parts for small steam, gas and petrol engines, together with finished models and a gas engine driving a Stuart dynamo. But the biggest attraction on the stand was the new Stuart lathe, a screwcutter with head and headstock cast in one, the headstock having a mandrel with a ball-bearing thrust.



A 3½ in. and 5 in. gauge ball-bearing swivelling passenger truck bogie

The price was five guineas.

It is, therefore, a particular pleasure for the veteran visitors to meet Stuart Turner's once again with an interesting stand for the modelling world of 1957.

Another old friend is the Myford Engineering Company of Beeston, Nottingham. In the model engineering vocabulary Myford and lathe have become interchangeable words and MODEL ENGINEER readers will, therefore, not need to be told about the ML7 and the Super Seven which will be demonstrated in the Metalworking section. To some of them, however, the ML8 and the PR11 bench planer may be less familiar. Both will be seen in the Woodworking section where F. Pain, the famous woodturner, will be demonstrating. There is also a staff on duty to answer questions and give advice.

The great value of the trade stands lies in the practical service which their displays offer to the modeller. Kennion Brothers of 2 Railway Place, Hertford, provide an excellent example. Anyone building an LBSC engine is likely to find everything he wants here: blueprints, castings, fittings, and injector reamers.

There are also castings for the 5 in. gauge LMS 0-6-0 tank engine *Butch*, drawings and castings for the new 5 in. gauge four-cylinder 4-6-0 King Class locomotive, notable new passenger-truck bogies, and all sorts of other things from taps and dies to thread charts and double-ended boring bars. Modellers in search of materials such as sheet metal and rods may end their search at this stand.

The modeller who is working on *Virginia* may care to know that W. K. Waugh of 31 Hillfoot Drive, Bearsden, Glasgow, has a complete set of castings for this picturesque American locomotive of LBSC's design. There is a chance of winning the set as the Wilway prize in the competition section.

Finished machines made from standard sets of machined castings are shown by E. W. Cowell Ltd, the machine tool manufacturers, of 7a Sydney Road, Watford, Herts. Here we see a bench type power hack-saw designed by A. E. Bowyer Lowe, a hand-shaping machine, a machine vice, a compound milling table unit and an ML rack-feed attachment.

Everyone with a workshop will discover plenty of use for the Rotacut shears manufactured by the Rayment Engineering Company of Sudbury Airfield, Sussex. Briefly, the machine has two hardened rotary blades serrated at the top and these feed the material towards the lower cutting blade. When cutting to depth the material can be removed by the flick of a pawl.

There was a large electric layout, entirely controlled from a signal cabin and fitted with a track circuit system, among the trade exhibits at the first ME Exhibition. One of the companies providing for the model railway enthusiast half a century later is Allen Brett Cannon Ltd, of 32 Railway Approach, London Bridge. Besides displaying an attractive range of model railways, kits and boats, the Allen Brett Cannon stand shows a layout driven by ABC power-pack units.

All generations have an eager welcome, too, for Hobbies Ltd and Bond's o' Euston Road, the companions of many modellers from their early boyhood. Besides demonstrating what can be done in handicrafts by fretsaw and machine, Hobbies present their famous kits and a variety of models built from them—including ship models, with the *Empress of Britain* at the end of a proud line.

One of the many services offered the modeller by The Web Model Fitting Company of 204 High Road, Wood Green, North, London, is the repetition in large or small quantities of components made to drawings.

The Web display also gives an idea of the great range of fittings obtainable. Fittings for yachts and liners, marine fittings for steam, naval fittings, boilers—they are all here. Industrial and scientific research is another concern of this progressive and interesting company.

Clutch problems are solved by P. B. Engineering of 86 King William Street, Coventry, in a display of castings and parts for a countershaft unit, a new motor mounted clutch, and helpful pictures. P. B. Engineering has a special reputation for units of this kind.

Modeller and handyman can take the tools to the job in the easiest possible way with the help of the Hobbyfix "bench in a box." This universal holding tool, introduced from Switzerland by M. J. Sudjic of 5 Hillcrest Road, Acton, London, W3, comprises a multiple vice, clamp, cramp, hand centring tool, drill, wrench and other devices, all in light and portable form.

It can be used for wood, metal or any other likely material. With it on the Hobbyfix stand the visitor will see a handyman's portable bench constructed of Erecto slotted-angle steel frame with a Parana Pine two-piece top.

There is more help for the modeller and the handyman on the stand occupied by Fisco Ltd of 602 Seven Sisters Road, London, N15. The Fisco flexible steel tape rules measure to six feet or two metres in any required graduation, and the architect's pins and coloured pins with non-corrosive heads are, in their own way, equally a boon.

It will already be clear that trade exhibitors are aware of the natural link between the modelling and make-it-yourself movements. Braid Brothers of 50 Birchwood Avenue, Hackbridge, Surrey, were pioneers in supplying refrigeration designs for the home craftsman, and their stand exhibits everything that he may need, including the latest hermetically sealed systems for modernising pre-war units.

Do you know that a person who has never tried French polishing in his life can get an excellent finish on raw or stained wood ? The demonstrators from Furniglass of 14-15 Dingwall Road, Croydon, Surrey, show how simply this can be done and also how the process can be used for repairing damaged surfaces.

Balsa wood was being used for models many years ago and is now in greater demand than ever—not least, of course, by the aircraft modellers whose numbers grow every week, whereas in 1907 the only aircraft models were the pioneering designs of Alliott Verdon Roe and others. The clubs are so well acquainted with Solarbo balsa wood that nothing need be said of it here, except that its manufacturers, Plantation Wood (Lancing) Ltd of Commerce Way, Lancing, Sussex, are showing it in the Exhibition.

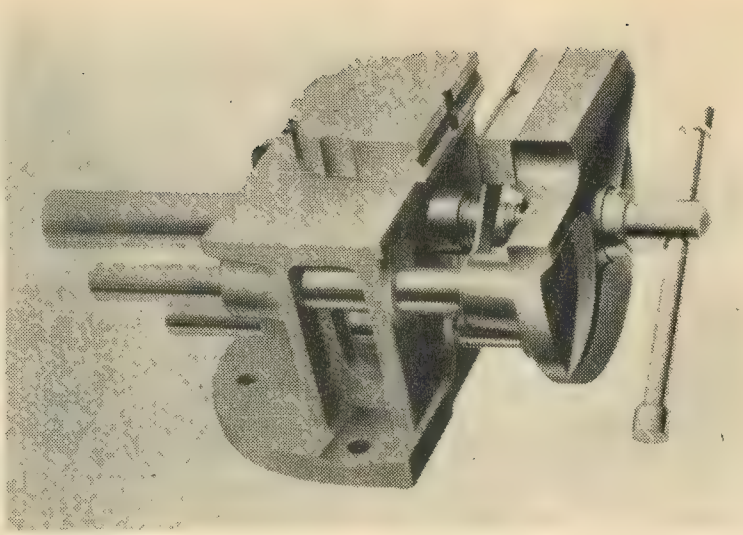
The toys at the 1907 Exhibition were of wood. Fifty years later we have plastics as a highly convenient material for almost any small facsimile, and in the kits known as the Lindberg Line the younger modellers in particular will find much to excite their interest, especially if they follow the displays by Model Toys Ltd in the Demonstration area and learn from them what can be done. The Lindberg Line has become known across the world.

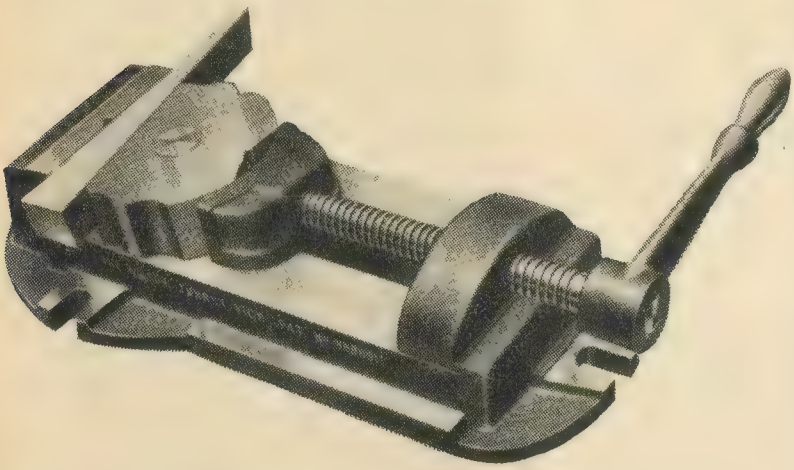
Talking of toys, most of us can remember when we were first thrilled as children by the gyroscopic top. The scientific version shown by William Levene Ltd of 30a Sackville Street, London, should bring the boys crowding with their fathers to the Levene stand; and the fathers who make a study of clocks will recall that the gyroscope was established as a practical invention by Leon Foucault of pendulum fame. In addition, the scientific multiscope with magnifying lenses will be demonstrated daily, to the fascination of all ages.

Many visitors are always grateful, in particular, for the small but important discoveries which they make on the trades section. Suddenly, while strolling by the stands, they come upon exactly the thing they wanted, the aid that makes all the difference to a specific task or to their work in general. The new AP sharpener and glass cutter for opalite, vitrolite, and plate and sheet glass will, for instance, be appreciated by those who are concerned with any of these materials, and they will, therefore, be glad that R. J. Deaves was represented in the show.

Similarly, the visitors who need stencils, steel stamps and punches, rubber and metal stamps, stencil inks, paints, brushes and other marking devices and accessories will feel kindly towards Heller and Sons (Engineers) Ltd of 51b-53b Turnpike Lane, Hornsey, London, N8, who display these items on their stand.

Yes ! There is an ME stand too. Specialists will be there to answer technical questions and to demonstrate any aspect of locomotive construction (except boiler work) which visitors may request. They welcome, in particular, queries on locomotive



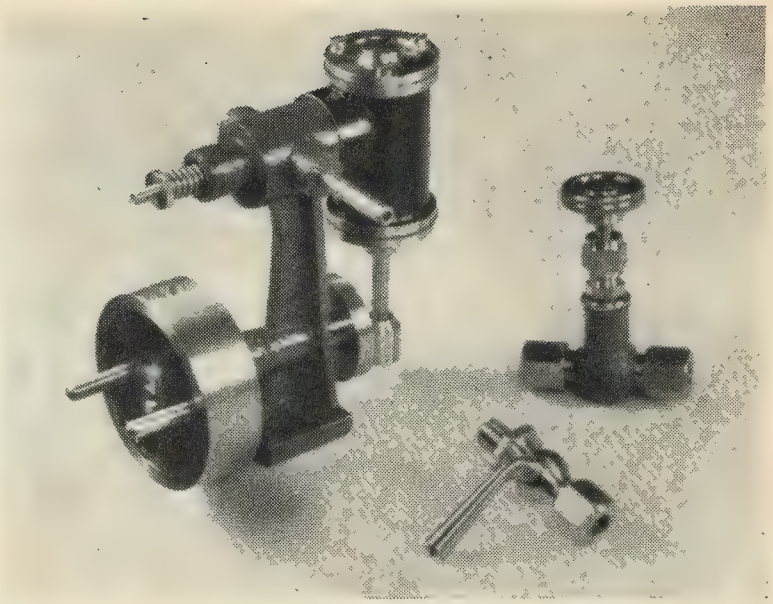


Above: *Turret jaw bench vice*
Below: *Wilson turret jaw machine vice*

TRADE STANDS . . .

building in gauges from OO to 7¼ in. This is, therefore, a richly comprehenisve service for the model locomotive engineer, and even the modeller without technical problems —if he exists—will be interested in the gauge 1 chassis which is to be described in a MODEL ENGINEER series.

Books were shown at the first Exhibition—books to satisfy the hunger for reading and knowledge that was one of the finest heritages from the Victorian Age. Professors and apprentices rubbed shoulders at the Percival Marshall stand, and there will be an equally diverse public at the same stand this year. The publishers who gave model engineering its first literature have been alert to satisfy the needs of each generation in turn, and here in gay and attractive jackets are the books which the modellers of the English-speaking world are reading in 1957. ▣



Web double-acting oscillating marine engine for model boats, with stop cock and turn cock

THE SKYLARK

SHAPED like a huge pencil 25 ft long, Britain's first upper atmosphere research rocket, known as Skylark, will soon be travelling a hundred miles or more above the earth's surface.

Skylark has already attained heights up to 50 miles during its initial proving trials at the rocket range at Woomera, Australia, and a later version, which will use a higher-energy propellant and a small separating booster rocket, is expected to reach a maximum ceiling of 700,000 ft—or 133 miles.

Designed specifically for the Upper Atmosphere Research programme of the Geophysical Year, it will be used to aid scientists in their efforts to learn more about deep sea ocean currents, tides, weather and climatic conditions, the high atmosphere and surrounding space.

More than a ton in weight, the rocket is launched from a massive steel tower, 80 ft high, and, during flight, travels at a speed five times greater than that of sound—over 3,000 m.p.h.

To achieve this fantastic performance, Skylark is powered by a solid-propellant motor, known as Raven, giving a thrust over a period of 30 sec. of some 11,000 lb. The long cylindrical pressure shell for this motor—which forms virtually the whole of the rocket's body—has been developed and manufactured by Bristol.

In building these ultra-light, high-tensile steel, all-welded rocket motor cases, which have to withstand the enormous pressures produced by the burning propellant, the Bristol team has had to solve many intricate metallurgical and engineering problems—problems that will undoubtedly have a far wider application in the construction and design of the supersonic aircraft of the future.

On "live" firings, the rocket will carry a payload of 50-150 lb. in addition to telemetry, Doppler and beacon tracking apparatus. Investigations to be made include the radio-reflecting ionised layers in the upper atmosphere, high airglow, wind, atmospheric temperature and pressure and measurements of the rocket's skin temperature.

Most of the measurements obtained with the Skylark will be telemetred to ground stations during flight, and the vehicle will break up in its descent into the lower atmosphere. In later versions, it is hoped that apparatus carrying permanent records, such as cameras and spectroscopes, will be recoverable by a parachute system. ▣

Doncaster's new roof

MODERN awning type roofs are being built over platforms Nos 4, 5 and 6 and cold cathode electric lighting installed at Doncaster station, Eastern Region. It is expected that the reroofing will be completed by the end of this year.

The new roofs will be of modern design built of glass and asbestos cement decking upon steel framing, supported by steel stanchions and cross members. To provide good weather protection to passengers the awning roofs will have deep valances along the edges.

The cold cathode lighting fittings are linear in design and create an extremely even illumination. The station name is incorporated in the mask of the light fitting making station identification easy for passengers travelling by day or night.

EXHIBITION GUIDE

ATTRACTIONS

(Other than those marked in full)

	On Plan
"Ye Olde Model Shoppe"	M
Metrology demonstrations by Enfield Technical College	
ME Clock	C
ME Workshop	W
"Precipitron" Air Filter	S

CLUB STANDS

	On Plan
Festiniog Railway Society	F
Northern Association of Model Engineers	NAME
North London Society of Model Engineers	NLSME
Society of Model and Experimental Engineers	SMEE
National Clubs Group	
Association of Model Railway Clubs	
Model Power Boat Association	
Model Rail Car Association	
Ship Model Societies	
Society of Model Aeronautical Engineers	
Local Clubs Group	
Malden Model Engineering Society	
Narrow Gauge Railway Society	
Sutton Model Engineering Club	
St Albans Model Engineering Club	
Tramway and Light Railway Society	
Vickers-Armstrongs (Weybridge) Ltd Social Club (Models Section)	

TRADE DISPLAYS

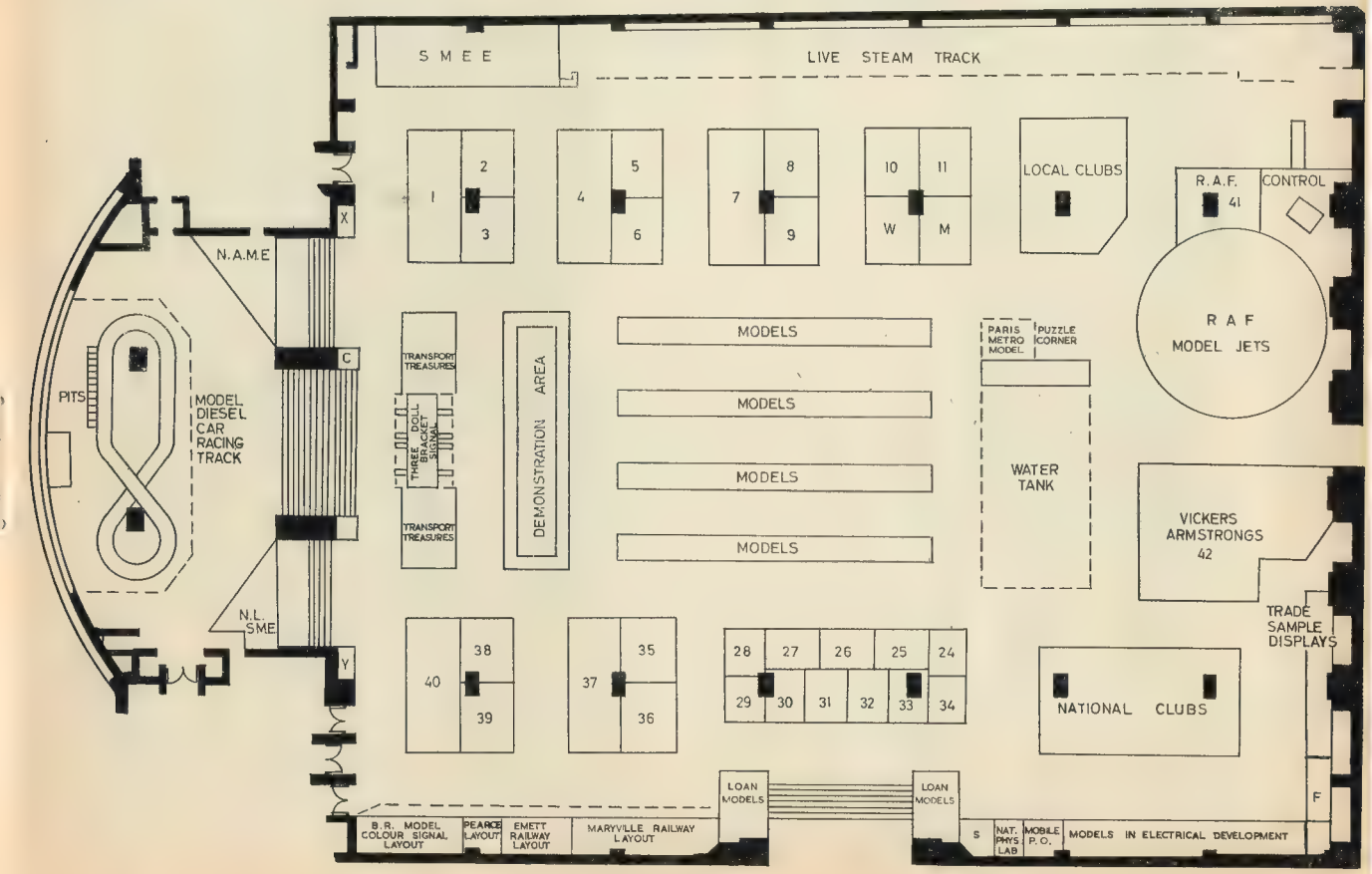
(Bottom right hand corner of Plan)

E. W. Cowell Ltd
Fisco Ltd
Plantation Wood Ltd (Solarbo)
P. B. Engineering
W. K. Waugh
Webb Model Fitting Co.

TRADE STANDS

	Stand No.
Allen Brett Cannon Ltd	7
Braid Bros.	X and Y
W. H. Colt (Engineers) Ltd	9
Contest Kits Ltd	35
R. J. Deaves	29
Denfords Engineering Co. Ltd	1
Furniglas Ltd	8
Heller and Sons (Engineers) Ltd	36
Hobbies Ltd	3
Hobby Fix	5
Kennion Tools	40
Kennion Bros (Hertford) Ltd	37
William Levene Ltd	11
Munster Developments Co. (Fulham) Ltd	34
Myford Engineering Co. Ltd	4
E. R. Otley Ltd	6
Partridge's Models Ltd	24
Percival Marshall and Co. Ltd ...	25, 26 and 27
John M. Perkins and Smith Ltd	31
Rayment Engineering Company	38
RAF	41
Stuart Turner Ltd	39
United Appeal for the Blind	30
Vickers-Armstrongs Ltd	42
Web Model Fitting Co.	28

There is a Visitors' Lounge in the Lecture Hall, First Floor



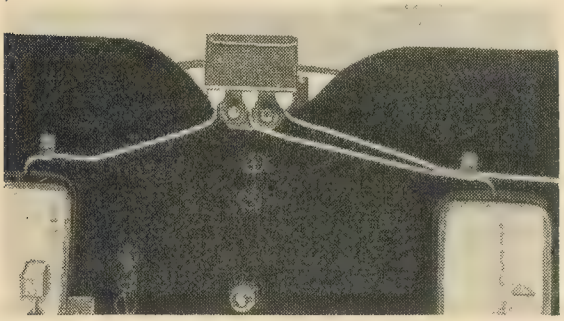
Loco axle box lubrication

Or overcoming that problem of inaccessibility

By ARTHUR W. SMITH

THE lubrication of small locomotive axle boxes is generally a difficult operation because the oil holes are often inaccessible, even if one uses a pump oil can with a very fine and long spout.

While building my *Britannia* and having had the experience with my first engine—*Iris*—I came to the conclusion that accessibility was a "must" and, therefore, made a few experiments with tubing of very small bore. This tubing is of the stainless quality as used for making injection needles with a bore of 0.026 in. and an outside diameter of 0.044 in.



Close-up of the oil-box, showing run of piping to the hornstays

The experiments, which proved successful, were carried out on a tube shaped as if to run into an axle box, being about 6 in. long and lying almost horizontally with the higher end turned upwards for about an inch and vertical. This tube passed oil in under 90 seconds, the oil used being Shell Vitrea—which is what I use on my Myford as well as on my engines.

The oil boxes, as illustrated, are fixed to the engine frames near the top, which brings them below the running boards and, as the latter are rather high in *Britannia*, they do not interfere.

Each oil box contains three oil pockets—one for each axle box—and each takes about 12 minutes to empty. This does not mean that one must fill them up every few minutes; one of these charges should last the engine for a few hours of running.

The boxes are made of a piece of brass 1 in. × $\frac{1}{2}$ in. × $\frac{1}{4}$ in. thick, each with three holes drilled in it to hold the oil. All details and dimensions are given in Fig. 1 and the procedure is as follows:

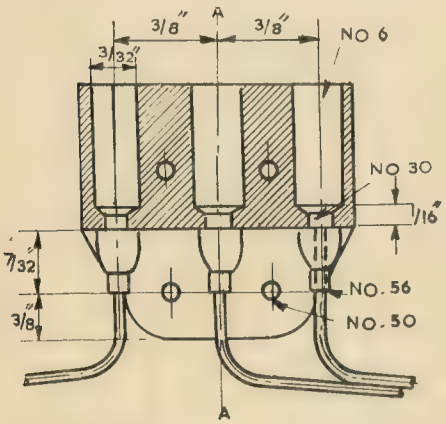
Mark out the holes and drill right through with a No 30 drill, follow it up with a No 6, but only to within $\frac{1}{16}$ in. from the bottom. Then make six tiny reducers from brass. For this operation chuck a piece of 5/32 in. brass rod in the 3-jaw, face, centre and drill No 56 far enough in to meet the parting tool. Reduce the end to 5/64 in. with a forming tool to the shape shown, and then at 7/32 in. from the end reduce the diameter to $\frac{1}{8}$ in. for $\frac{1}{16}$ in. and part off. The reducing may be done with the parting tool itself, and a nice sharp shoulder is left.

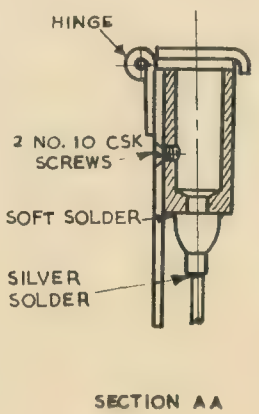
The back plate is a piece of 1/32 in. brass cut the same shape as the box with an extension at the bottom to take the two holes for the fixing screws. These are 10 BA and screw right into the frames. The back plate is screwed on to the box with two 10 BA countersunk screws as depicted.

The lid is just an ordinary commercial brass hinge with one leg soldered or riveted on to the back plate. The other leg has a small plate bent to the shape shown and soldered on to it; this covers up the screw holes in it.

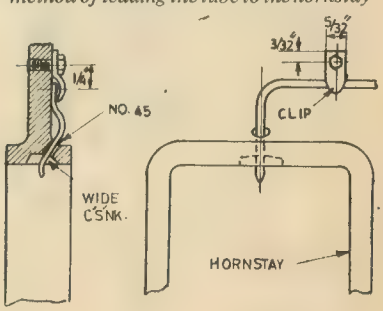
Now before going further, drill holes —about twice the diameter of the oil tubes—diagonally into the top of each hornstay (Fig. 2) to come out on the inside as near the centre as possible. Countersink the holes on the inside with a $\frac{1}{4}$ in. drill. This is important as otherwise the oil will run down the sides of the axle box instead of dropping into the lubricating hole. The countersink should be quite deep—the deeper the better.

Next silver solder the tubes into the little reducers. I used silver solder here because it prevents everything falling apart when the reducers are finally soldered into the boxes.





Left: Front and side sections through the oilbox, showing separate pockets and method of fixing the tubes
Below: Arrangement of the tube clip and method of leading the tube to the hornstay



Assembly of the oil box and tubing

Each tube should be slightly longer than required and can be marked for cutting off when everything is in place. Screw the backs on to the boxes and fix them to the frames, then set up the tubes and their reducers in their respective places, bending each tube until it fits nicely.

To get good bends use your fingers and a small piece of round stock in the vice. This tubing bends very easily. Once everything is in place the screw holes for the clips can be marked off, using them as templates. Mark off also the protruding tube in the hornstay and, when cutting off the end, cut it at a sharp angle instead of square. This helps the oil droplet to fall away and go straight into the oil hole of the axle box.

Incidentally, these oil holes should be well countersunk, and the tubes should protrude about $\frac{1}{16}$ in. below the top inside edge of the hornstay.

Finally reassemble complete with clips to ensure that everything is satisfactory, after which remove the lot from the frame, lay the ensembles on a flat surface and solder the reducers into the boxes. Actually this operation can be done before the tubes are fitted into the hornstays, but it means that they have to be removed and put back many times as each individual bend is made.

To make the clips use brass plate about 1/32 in. thick and cut and bend to the shape in the drawing. The middle ones are slightly longer as they have to secure two tubes.

Where the tubes pass behind the motion brackets they can be allowed a clear passage by filing a half round slot in the face next to the frame with an Abrafile. These files make a nice round slot and the tubes fit snugly and look well when the brackets are on. ▣

MODEL STEAM YACHT . . .

By W. H. Peirce

My model *Simba* has an interesting history. It was built about a century ago as a steam yacht of the period [see picture below] and was over 5 ft long.

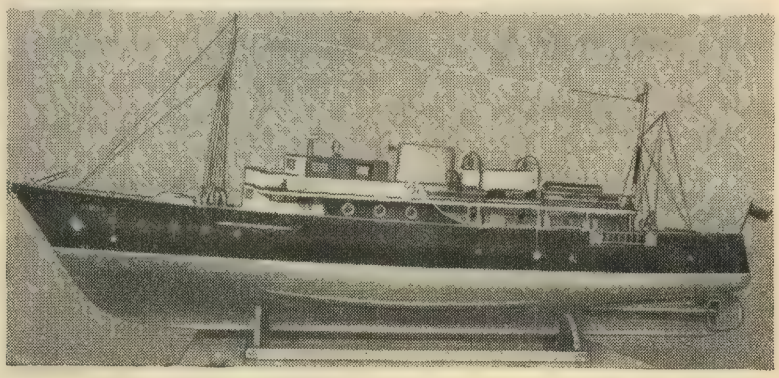
However, the model was very bulky to transport and so I decided to shorten it by refitting a cruiser stern. A glance at the accompanying picture will illustrate how modern it now looks.

It is fitted with a twin Stuart engine of the type used in the war by the Maquis for driving generators for radio transmission. In this case the engine drives twin screws through a gearbox made of old radar gears, etc. Other components include a Bassett-Lowke central flue boiler.

The boiler is fired by a butane gas picnic stove—much more reliable than the blowlamp formerly installed—and it can be radio controlled. ▣

The model in its original form

The SIMBA *after its conversion*



TRACTION EN

A pictorial review of the

Northleach

SPECTATORS converged at Upperend Farm, Northleach, Gloucestershire, for the 1957 steam traction engine rally.

Nine engines in all took part. They were:

1931 shaft-drive Sentinel driven by Ian Woollett.

1925 Foden tractor *Matilda* owned by Mr Middleton, of Hartlebury.

1929 Foden overtype wagon owned by T. T. Boughton, of Amersham.

McLaren 5 h.p. agricultural engine owned by J. P. Bury, of Great Tew.

Burrell 6 h.p. road loco owned by Mr Quicke, of Bampton.

1909 Fowler 7 h.p. agricultural engine owned by Mr Melhuish, of Chipping Norton.

Lord Nelson Burrell scenic showmen's engine owned by C. T. J. Nichols, of Gloucester.

Prince of Wales Burrell scenic showman's engine owned by James and Crockerell Ltd, of Durrington.

King George VI Burrell showman's engine owned by S. J. Wharton, of Minster Lovell.

Winner of the elegance class for engines was Mr Nichols' *Lord Nelson* in immaculate condition with its gleaming brass dynamo.

For the children there was a miniature railway, and the superb 2 in. scale working model of a showman's compound road loco *Lady Kathleen* made by E. Evans, of Stroud.

The model has an overall length of 43 in. with a width 16 in. and a height, to top of chimney, 23 in. Rear wheels are 13¼ in. × 3 in., and front wheels 9 in. × 1½ in. Cylinder bores are h.p. 1 1/16 in., l.p. 1¾ in. × 2 in. stroke. Gear ratios are 11-1 top gear and 22-1 low gear, and the diameter of the flywheel is 8¼ in. It is fitted with differential gear and winding drum; boiler feed is by pump and injector and the dynamo has an output of 120 watts at 200 r.p.m. of engine. Working pressure is 100 p.s.i. ▣

Key to pictures

1 *A 1929 Foden overtype wagon holds the attention of each member of this family at the Northleach rally*

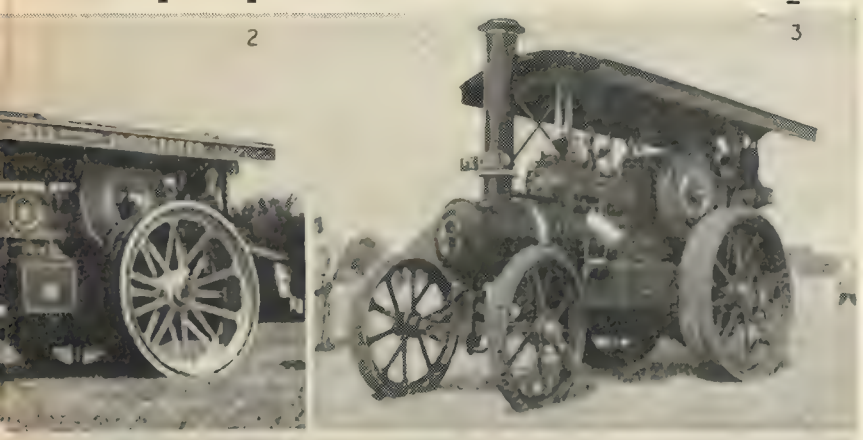
2 *Lord Nelson—winner of the elegance prize at Northleach*

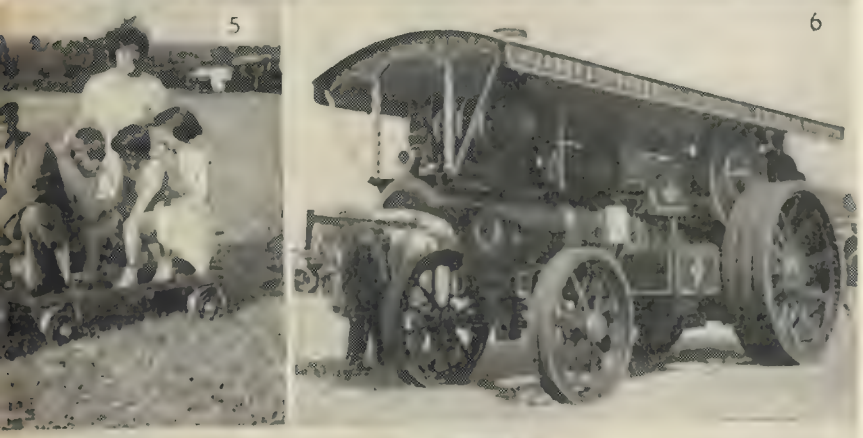
3 *The 6-ton 4 h.p. 1921 Garrett Patricia, which featured in the ladies' race at the Appleford rally*

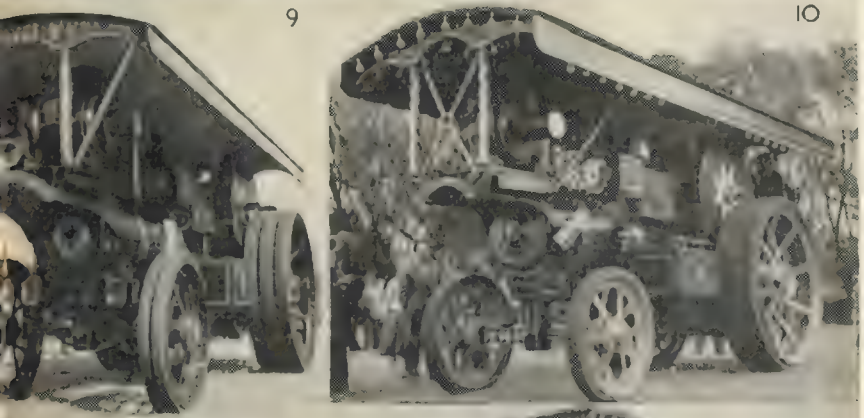
4 *E. Evans, of Stroud, with his 2 in. working scale model of a showman's compound road loco.*

GINE RALLIES

summer's principal events







Appleford

OVER five thousand people were present at the Appleford traction engine rally, the event being organised by the National Traction Engine Club. Eighteen engines and a number of veteran cars were on display.

The outstanding competitor was Mr Arthur Napper on his 1902 Marshall engine *Oldtimer*. He won the Curtis Challenge Trophy for the highest number of points gained in events.

Winner of the trophy for elegance and mechanical condition was the 1922 Burrell *Prince of Wales*—on its first visit to Appleford—and a close second was the 1913 Burrell *King George VI*, which has attended every Appleford rally since 1950.

Prince of Wales, owned by James and Crockerell Ltd, of Durrington, is a 14-ton 8 h.p. Burrell scenic type showman's engine and was driven by P. G. C. Barber, assisted by D. Dobson. *King George VI* was driven by its owner S. J. Wharton, of Minster Lovell, assisted by J. S. Hirons. It is a 13-ton 6 h.p. engine. After the racing both engines stood side by side working lights; they were in truly magnificent condition.

The rally was declared open by Mr Bob Arnold—Tom Forrest of the "Archers"—who joined Mr Napper on his *Oldtimer* for the opening parade.

The race between a Foden steam wagon and a Sentinel was won by the 1929 Foden, a 6-ton, 5 h.p. vehicle driven by H. Hearne and K. Spratt. The Foden was also awarded the Dacre Lacy Challenge Trophy for best performance by a newcomer. ■

5 *Mr Evans giving rides to children on the trailer towed by his model*

6 Prince of Wales—*a 1922 Burrell scenic at Appleford*

7 *Mr Evans makes an adjustment to his loco.*

8 *A 7-ton 5 h.p. 1925 Foster*—Matilda *—being driven on to its trailer at the close of the Appleford rally*

9 *A handsome* Prince of Wales

10 *A finely-detailed shot of* King George VI

11 1931 *shaft-drive Sentinel owned by Ian Woollett*

12 *Showman's class engines racing at Northleach. Left:* King George VI; *centre:* Lord Nelson; *right:* Prince of Wales

13 *Two showmen's engines—a highlight of the Appleford rally*

H. S. Wainwright's D-class 4-4-0s

'Truly spectacular.' That is the description J. N. MASKELYNE applies to those early express passenger engines of the SECR

How well I remember the sensation that was caused when the first of these beautiful engines was put into traffic in 1901.

In the previous year, the South Eastern and the London Chatham and Dover Railways were combined under a management committee to become the South Eastern and Chatham Railway. The two former locomotive superintendents of the separate companies, James Stirling and William Kirtley, retired, and the combined departments were placed under the charge of Harry S. Wainwright, who had been carriage and wagon superintendent of the former South Eastern Railway under Stirling—but was not then regarded as a locomotive man.

Yet within 18 months he produced, first, some 0-4-4 tank engines for local work, followed by a number of singularly fascinating 0-6-0 goods engines and, then, the pioneer examples of his truly spectacular 4-4-0 express passenger engines of Class D, the subject of this article.

The drawing can do no more than give a bare idea of the graceful outline and extremely pleasing proportions of this design. Painted and lined out in the elaborate livery adopted by Wainwright, and additionally embellished by the provision of copper caps to the chimneys, the whole was kept spotlessly clean. These engines, together with the similar E class which followed, were almost the last examples of Victorian and Edwardian finery.

The modern generation can have no conception of the effect produced by the sight of a locomotive finished in this style; it was almost breathtaking, but not in the least garish or flamboyant. I am glad to be able to add that engine No 737 has been saved from the scrap heap and is being restored to her original condition.

If the work is carried out with anything like the care and skill that were devoted to the decoration of the original engines, then No 737 will, indeed, be a sight worth seeing. It should not present any serious difficulty; all the necessary information exists at Ashford.

Very little structural alteration will be required because this engine, withdrawn in November, 1956, is virtually in her original state. So far as I can see, little need be done except for the removal of the raised coalplates from the top of the tender coping and the provision of a new copper-topped chimney of the original pattern—and I know there is a drawing for that.

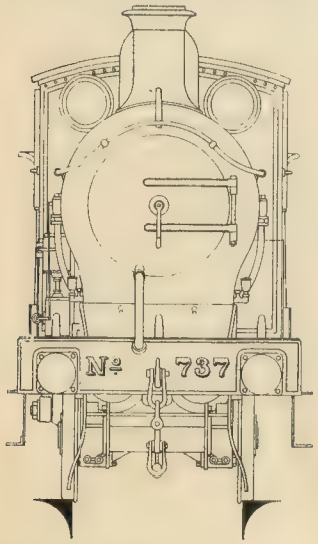
The rest, to restore her exactly to her pristine beauty, is merely a matter of repainting.

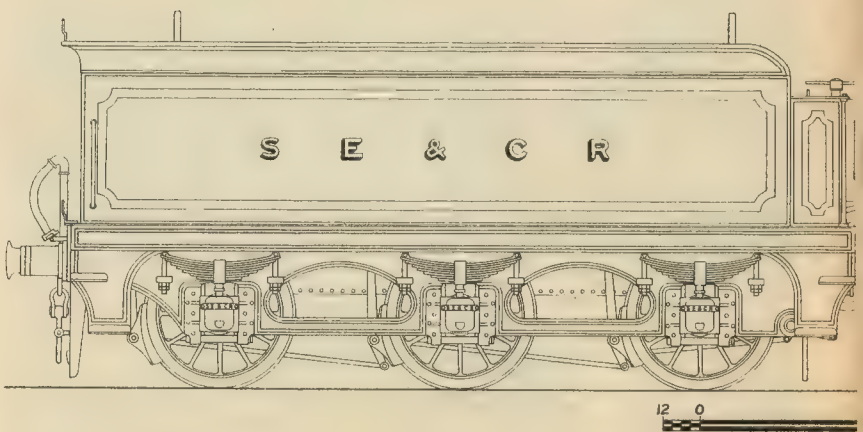
When new, these engines, of which there were 51, at once took over the working of the best express trains of the SECR, including the whole of the Continental traffic between London, Dover and Folkestone.

The engines soon proved that their virtues were not all wrapped up in good looks. The routes were heavy and difficult compared with most other British main lines. It used to be said that nowhere on the SECR was there even so much as one level mile, and I believe that to be true. Yet these fine engines could haul greater loads at higher speeds—and on less coal—than their predecessors.

Models of these engines can be very attractive, but for the really meticulous modeller there was one big snag: the driving and coupled wheels had 21 spokes instead of the more usual 22. The only model of a D known to me in which the number of spokes has been correctly represented is the beautiful 7 mm. scale model of No 735 owned by my friend Mr S. W. Norris.

The 51 engines of this class were built in the following order: In 1901, ten, Nos 726 to 735, by Sharp Stewart and Co., of Glasgow; five, Nos 741 to 745, from Robert Stephenson and Co., of Newcastle; five, Nos 736 to 740, from the SECR works at Ashford. In 1902, five, Nos 57, 246, 487, 488 and 490, from Ashford. In 1903, ten,





Nos 75, 92, 145, 247, 489, 492, 493, 494, 501 and 502, from Dübs and Co., of Glasgow, and five, Nos 746 to 750, from the Vulcan Foundry Ltd, of Leeds. Ashford built the final 11, delivering five, Nos 470, 509, 545, 549 and 577, in 1906, and six, Nos 477, 496, 505, 574, 586 and 591, in 1907.

It will be seen from this list that 737, when she was withdrawn in November 1956, was one of the oldest, having reached the ripe old age of 55 years—a resounding tribute to her quality. She had never been rebuilt, and finished her days at Guildford whence she generally worked local trains to Reading.

She shared this duty with her sister, No 75 (BR No 31075), which was two years younger and was actually the last active survivor of the D class, being withdrawn in December 1956.

The original dimensions were quite typical of the practice of those days: cylinders, 19 in. dia. × 26 in. stroke; the coupled wheels were 6 ft 8 in. dia., and the bogie wheels were 3 ft 7 in. The wheel base was 22 ft 11½ in. divided into 6 ft 3 in. plus 7 ft 8½ in. plus 9 ft. The leading overhang was 2 ft 4 in. to the back of the buffer-beam, which was 1⅛ in. thick; the rear overhang was 3 ft 11¾ in.

The boiler, pitched 8 ft from rail level, was made in two rings, the larger of which was 4 ft 9 in. dia. outside, the smaller (front) one being 4 ft 7⅞ in. dia. There were 263 tubes of 1¾ in. o.d.; according to the original specification they were made of "Kora" metal, but whether this was some form of brass or steel I have been unable to discover.

The length between tubeplates was 11 ft 5⅝ in., and the tubes were cambered 1⅛ in.; that is to say they were not dead straight, but were higher in the middle than they were at the ends.

The outside fire-box casing was 6 ft 6 in. long and 4 ft ½ in. wide; the inner box was 5 ft 10$\frac{13}{16}$ in. long and 3 ft 5⅜ in. wide, the grate being horizontal, 6 ft 6 in. below the top of the box. The grate area was 20 sq. ft.

Stephenson link motion with locomotive-type links was employed. The throw of the eccentrics was 3¼ in., but the valve travel in full gear was 4⅛ in. The valves were provided with 1$\frac{1}{16}$ in. lap, and there was no lap or clearance on the exhaust side, according to the drawings. The steam ports were 1⅛ in. wide, exhaust ports 3½ in. wide, their common length being 18 in. The connecting-rods were 6 ft 10 in. long, and the eccentric rods 4 ft 10 in.

A total heating surface of 1,505 sq. ft was made up of 1,381 sq. ft for the tubes and 124 sq. ft for the fire-box; the working pressure was 180 p.s.i.

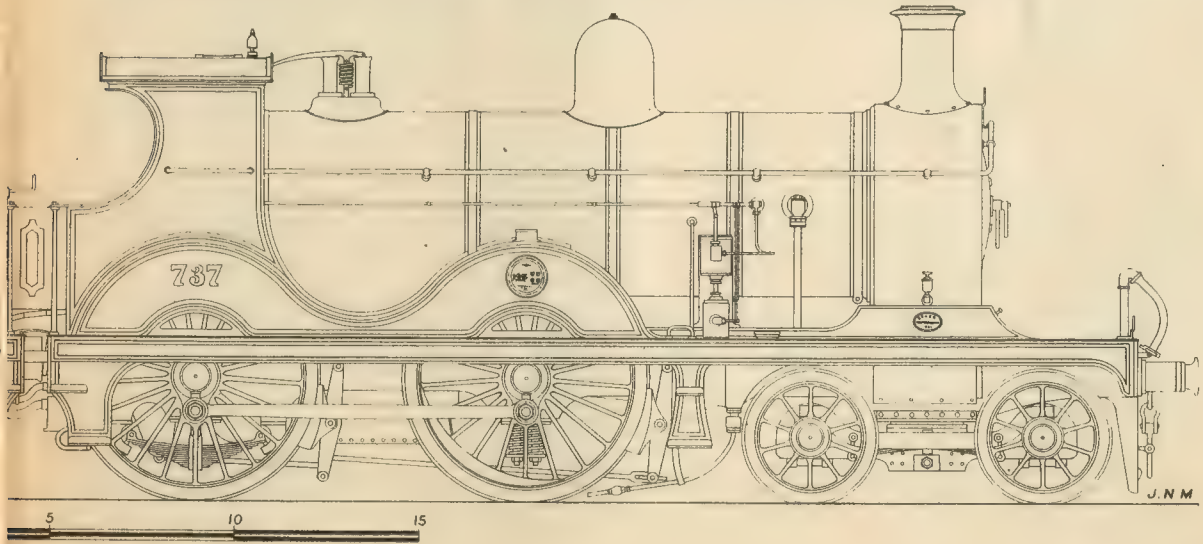
In working order, the engine weighed 50 tons, with 17 tons on the bogie, 16 tons 17 cwt on the driving wheels and 16 tons 3 cwt on the tailing wheels. I should add that the reversing gear was operated by steam power, and other equipment included automatic vacuum brakes and steam sanding apparatus.

The tender was mounted on six 4-ft wheels, the wheel base being 13 ft equally divided. Loaded with 3,300 gallons of water and 4½ tons of coal, the weight was 39 tons 14 cwt.

The total length of engine and tender over buffers has been variously recorded; on the official weight diagram it is given as 54 ft 11⅞ in. whereas the specification gives it as 54 ft 10¾ in.

My drawing, worked out from the official drawings, agrees with the latter figure, so where the difference arises is a mystery. Possibly, the buffers and drawgear have been altered since the engines were built; this, coupled with the fact that the weight diagram is of much later date than the working drawings, may be the explanation.

To the end, the D class engines did their work punctually and with precision, even with very heavy trains, while their graceful shape was always a joy to see. ▣



ROSE

LBSC's second instalment for building a simple 2½ in. gauge beginner's locomotive deals with the crank axle, eccentric and cylinder

Continued from 8 August 1957, pages 198 to 200

CORRESPONDENCE over many years has indicated that novices usually have difficulty in making a crank axle and getting it to run truly. Over 65 years ago I made a crank axle, using a big French nail for the axle; the webs were cut from a discarded brass clock plate, and the axle ran truly.

The method used was similar to that I am about to describe, except that I didn't turn wheel seats and crank pin ends—I had no lathe—and soldered the joints as I had no blowlamp.

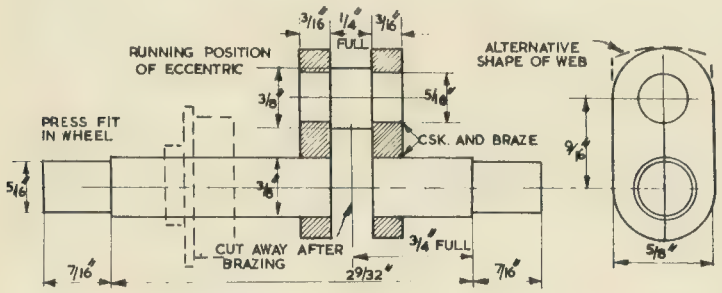
First turn a straight axle exactly as described in the previous instalment. Saw off two pieces of $\frac{3}{16}$ in. × $\frac{5}{8}$ in. mild steel, each $1\frac{1}{4}$ in. long. Set out the axle and crank pin centres on one of these, taking care to make the pop marks dead on the centre line, clamp them together, and drill a $\frac{5}{16}$ in. hole through each mark.

Open out one with a 23/64 in. drill, separate them, and open out the larger holes with the lead end of a $\frac{3}{8}$ in. parallel reamer until they are a very tight fit on the axle. Countersink one side of all the holes.

Chuck a bit of $\frac{3}{8}$ in. round mild steel, face off, turn $\frac{3}{16}$ in. length to a very tight fit in the $\frac{5}{16}$ in. hole, part off at $\frac{7}{16}$ in. from the shoulder, and turn down the other end to the same dimensions. Squeeze a web on each end, countersinks outward, then drive the axle through the larger holes until it projects $\frac{7}{16}$ in. plus 1/64 in. from the shoulder. This will automatically line up the webs.

Bend two pieces of 16-gauge soft brass wire into rings, put one at each side of the crank webs as close to them as possible, cover with wet flux (Boron compo mixed to a paste with water), place some more around the ends of the crank pin, put the assembly in the brazing pan on its side, and heat to bright red. As soon as the wire ring melts and disappears into the countersink, touch the end of the pin with a piece of the same kind of brass wire which will melt and fill up the countersink. Turn the axle over and repeat the operation on the other web.

Let it cool to black, quench out in cold water, then very carefully saw out the bit of axle between the webs. Finally, clean up the lot. It doesn't make any difference whether the ends are rounded off or left square—just please yourself. Simple job, isn't it?



ECCENTRIC AND STOP COLLAR

Chuck a short piece of 1 in. round mild steel (a stub or offcut of 1 in. shafting does fine), face the end, and turn down $\frac{1}{4}$ in. length to $\frac{7}{8}$ in. dia. Part off at $\frac{3}{16}$ in. from the shoulder. At $\frac{3}{16}$ in. from centre indicated by tool marks, make a centre pop, and chuck in the four-jaw with this running truly.

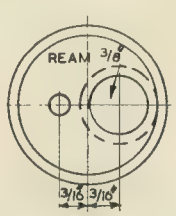
Open out with a centre drill, then drill through with 23/64 in. drill and ream $\frac{3}{8}$ in. Mount this on a stub mandrel (short piece of steel turned to a drive fit in the hole) with the flange outwards, chuck the mandrel in the three-jaw and turn down the flange for $\frac{1}{8}$ in. length to $\frac{1}{2}$ in. dia., then skim the end true. On the opposite side at $\frac{3}{16}$ in. from centre, drill a No 32 hole and squeeze a $\frac{1}{8}$ in. silver-steel pin in it, letting $\frac{1}{8}$ in. project. This eccentric should just slide on the crank axle without shake.

For the stop-collar, chuck the 1 in. rod again, face, centre, and drill to $\frac{3}{8}$ in. depth with a 23/64 in. drill. Part off at $\frac{1}{4}$ in. from the end, reverse in the chuck, and put a $\frac{3}{8}$ in. parallel reamer through the hole. Mill or saw and file away the segment as shown in the drawing, and drill and tap a hole in the thickness for a $\frac{1}{8}$ in. or 5 BA setscrew.

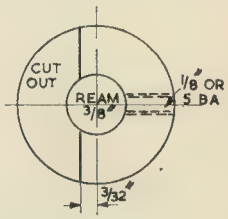
ASSEMBLY OF CRANK AXLE

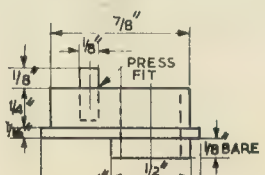
Put the stop collar on the longer end of the crank axle segment outwards, next the eccentric with the flange outwards, then the axle box for the right-hand side of the engine, also flange outwards. The left-hand axle box goes next the crank.

Jam a piece of metal between the crank webs so that the wheel can be pressed on (balance weight opposite crank) without bending the webs or otherwise distorting the axle. Then put the other wheel on the opposite end, setting the crank pins at right angles by the method described for other engines in these notes.

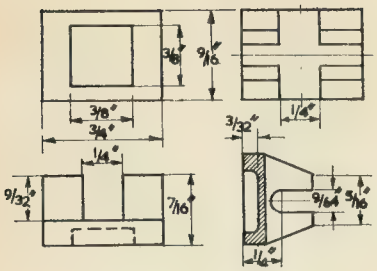


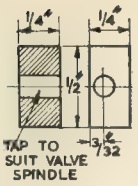
Above: The crank axle





Right: The eccentric and stop collar

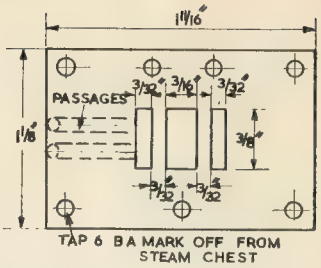




Left: Slide valve and nut

Right: The port face

Below: The cast steam chest and alternative built-up steam chest

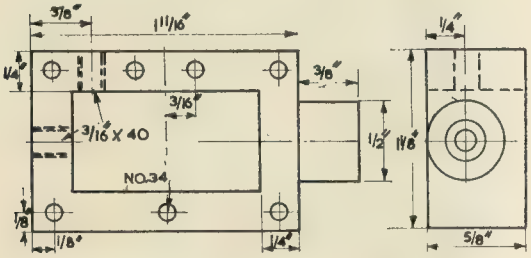


You needn't bother about "mike" measurements on this particular job, for a reason you'll see in a minute. Put the assembly in the frame, making sure the axle boxes are in the right hornslots, and put in the hornstay screws.

COUPLING-RODS

The coupling-rods can be milled or sawn and filed from $\frac{3}{16}$ in. × $\frac{1}{2}$ in. mild steel, but anybody who hasn't a milling machine but gets aching arms when sawing and filing can use the following method.

Make the middle part of the rod



from a length of $\frac{1}{8}$ in. × $\frac{3}{16}$ in. steel, sawing and filing a step at each end (see drawing) and brazing on a little block of $\frac{1}{2}$ in. × $\frac{3}{16}$ in. steel with a corresponding step in it. You can put a $\frac{1}{16}$ in. iron rivet through each joint to hold the bits together while brazing the joints. Then the only filing needed will be the bosses at each end. Drill the holes first (check the centres from the centres of your axles in case the latter aren't exactly to given measurements) and file the bosses to suit the holes.

One wheel should be pressed right home on the trailing axle (the straight one) and the other just put on as far as it will go by hand, the wheel seat being slightly eased for that purpose. Put a coupling-rod on the pressed side, then put on the other rod, adjusting the wheel until the rod goes easily on the crank pin, and the wheels will turn.

The crank pin in the driving wheel will have to be temporarily lengthened to bring it out level with the pin in the other wheel, naturally, but this is easily done by chucking a piece of $\frac{3}{16}$ in. mild steel rod, facing, centring, drilling No 40 and tapping to screw on the threaded end of the crankpin.

Adjust the unpressed wheel until both pairs of wheels will spin freely without any binding of the coupling-rods; then remove the "patent" crank pin extension, press home the last wheel, put on the coupling-rods and secure them with nuts and washers. The ordinary commercial kind will do quite well. The coupling-rods should be easy on the pins, but not slack. If too tight they will bind when the axle boxes move up and down on an uneven line.

THE CYLINDER

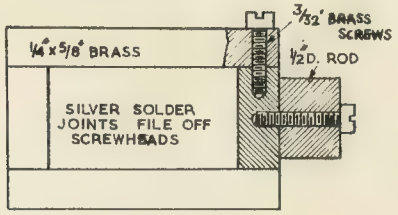
Castings should be available for the cylinder, but it can also be made without castings if a piece of $1\frac{1}{4}$ in. square rod of good quality bronze or gunmetal is available, about $1\frac{3}{4}$ in. long. Chuck this (or the casting) truly in the four-jaw; the solid piece should be centred, drilled $\frac{3}{16}$ in., then opened out with $\frac{5}{8}$ in. drill, and finally bored to slightly under size.

The casting will be cored, so bore out the core hole to similar size if an $\frac{11}{16}$ in. parallel reamer is available. Then ream as described for *Zoe*; a four-jaw chuck big enough to take the cylinder block will have a hole in it large enough to let the reamer go through far enough to form a true bore.

If no reamer is available just bore to size, taking the last two cuts without shifting the cross slide, then face off the end. The other end is faced off with the cylinder set up on a stub mandrel held in the chuck.

The portface and bolting face can both be trued up with the cylinder mounted end-up on an angle plate with a bolt through the bore, as previously described—or the block may be mounted in the four-jaw, as it is rectangular and not very large. Note that both the bolting face and portface are $\frac{5}{8}$ in. from the centre of the bore.

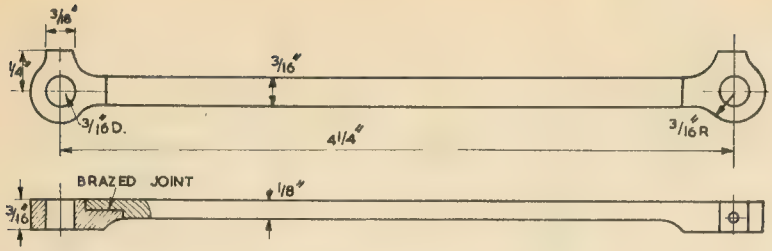
The ports can be marked off and cut as described for *Zoe* and *Virginia*. It doesn't matter if the ends are rounded instead of square as shown,



but they must not be more than $\frac{3}{8}$ in. long. Only two 3/32 in. or No 40 holes are required for passageways between the port and cylinder bore. I would remind beginners that outsize passageways are a mistake, as they only have to be filled with steam twice in each stroke, the steam being blown to waste when the exhaust port opens. So long as they can pass the steam required to run the engine without throttling it they are all right.

The cylinder covers, glands, piston and rod are all made in exactly the same way as described for the $1\frac{3}{4}$ in. gauge *Zoe*. Four 3/32 in. or 7 BA screws will be sufficient to attach the covers. At the spacing shown there will be no risk of the screws interfering with the ends of the passageways.

Incidentally, be careful when drilling the exhaust way. If the hole for the exhaust pipe is drilled in the top of the cylinder block exactly above the exhaust port and 7/32 in. from the edge of the portface, using a 7/32 in.



drill, a No 21 drill can be put down it at a slight angle (see section through exhaust port) and this will cut right into the port—at the same time clearing the cylinder bore with room to spare.

STEAM CHEST AND SLIDE VALVE

The steam chest can be cast or built up. If cast, chuck in the four-jaw and face off each side, then chuck endwise with the gland boss running as truly as possible. Turn this to size, face off, centre, drill through with a No 30 drill and feed in the drill until it goes right through the opposite end of the steam chest and locates the hole for the oil nipple. Open out to $\frac{3}{8}$ in. depth with a 7/32 in. drill and tap $\frac{1}{4}$ in. × 40. Turn the gland from $\frac{5}{16}$ in. hexagon rod.

Open out the hole in the other end with a 5/32 in. or No 22 drill and tap $\frac{3}{16}$ in. × 40. Drill another 5/32 in. hole and tap it likewise for the steam pipe, at $\frac{3}{8}$ in. from the end farthest away from the gland boss and in line with the horizontal one. Finally, drill the seven No 34 screwholes and smooth off any burring by rubbing the contact faces on a sheet of fine emerycloth laid on any true surface such as the drilling-machine table.

Clamp the steam chest temporarily to the cylinder portface and run the No 34 drill through all the holes, making countersinks on the portface. Remove chest, drill the countersinks No 44 and tap 6 BA.

The cover is a piece of $\frac{1}{8}$ in. brass plate $1\frac{1}{8}$ in. wide and $1\frac{11}{16}$ in. long. Clamp it to the steam chest, run the 34 drill through the lot and countersink the holes on one side, then true it up on a sheet of emerycloth as indicated.

A built-up steam chest can be made with two pieces of $\frac{5}{8}$ in. × $\frac{1}{4}$ in. brass rod $1\frac{11}{16}$ in. long and two $\frac{5}{8}$ in. long. Set them together to form a rectangle and put a 3/32 in. brass screw at each corner to hold them. Part off a $\frac{3}{8}$ in. length of $\frac{1}{2}$ in. round brass rod for the gland boss and attach that by another screw. Then silver solder all four corners and the gland boss, and finish off as described for the cast steam chest, fitting a similar cover.

The slide valve calls for a block of gunmetal or bronze measuring $\frac{9}{16}$ in. × $\frac{7}{16}$ in. and $\frac{3}{4}$ in. long. The exhaust cavity can be endmilled out or chipped as described for *Zoe*. It is essential that the groove for the nut is cut to an exact fit for same, so either mill it by clamping the valve on end under the slide-rest toolholder and traversing it across a $\frac{1}{4}$ in. end mill or slot drill in the three-jaw—or else clamping the valve in a machine vice on the lathe saddle and traversing it under a $\frac{1}{4}$ in. end-and-face cutter on an arbor between centres.

Take care to avoid cutting into the exhaust cavity. If you are unlucky, the trouble can be remedied by cutting a piece of 18-gauge brass or copper to the shape of the cavity, fitting it in and silver soldering it.

The easiest way to cut the groove for the valve spindle is to drill a 9/64 in. hole longways through the valve at $\frac{1}{4}$ in. from the bottom, then saw down to it from the top, filing away the sawmarks with a flat file and leaving the groove the same width as the hole. Bevel off each side of the valve as shown, and true up the working face as mentioned.

The valve spindle is a $2\frac{1}{4}$ in. length of $\frac{1}{8}$ in. rustless steel or drawn bronze rod, with $\frac{3}{4}$ in. of $\frac{1}{8}$ in. or 5 BA thread on one end and full $\frac{1}{8}$ in. on the other. The latter end is furnished with a fork or clevis made from $\frac{1}{4}$ in. square rod by the method described for valve-gear forks, to the dimensions shown.

The nut is a $\frac{1}{2}$ in. length of $\frac{1}{4}$ in. square brass rod, with a No 40 hole drilled through it and tapped to suit the valve spindle. This hole should be as close to one of the facets as possible so that when the whole bag of tricks is assembled—as shown in the complete section—the nut doesn't bear on the bottom of the groove. The valve should be able to lift off the portface about 1/64 in. when erected. Steam pressure keeps it in contact with the face when the engine is working.

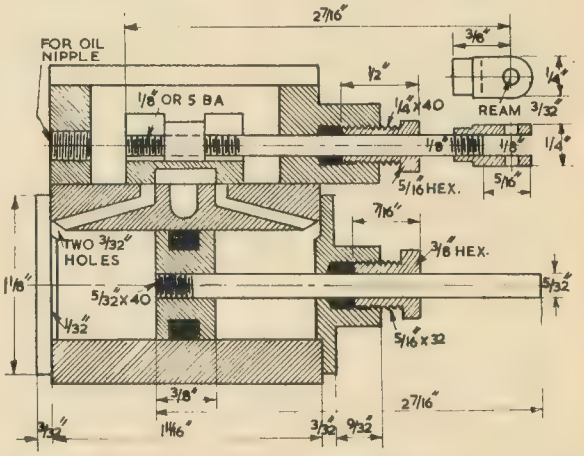
When assembling, pack the piston with a ring of square-braided graphited yarn as described for previous engines; use the ordinary stranded

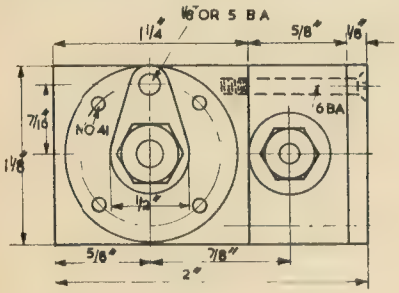
● *Continued on page 280*

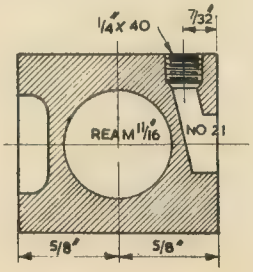
Above: *The coupling rods*

Right: *Section of the cylinder*

Below: *Back end of the cylinder and section through the exhaust port*







A WORKING MODEL OF ST NINIAN

By EDWARD BOWNESS

Part 17—In this instalment the author deals chiefly with the lifeboats and provides detailed instructions, with scale drawings, for their construction

Continued from 8 August 1957, pages 184 to 186

The ladder from the docking bridge should now be fixed in position. When the handrails are lined up with those on the docking bridge there should be a narrow space between the side of the house and the ladder. Small packing pieces should be glued on the side of the ladder to suit this space, after which the ladder can be cemented to the side of the house with tiny screws from the inside for further security.

The holes for these screws should be drilled just underneath a step so that if the points of the screws come through a little they will not be very noticeable. The top of the ladder should be cemented to the triangular web below the projecting platform which receives it. The bottom of the ladder merely rests on the deck planking as it must be free to come away with the house whenever it is removed.

The cowl ventilators on the docking bridge were described in part 14 (July 11) and presumably they are already in position. The remaining fittings—compass, engine room telegraph, reels, seats and lifebelt lockers—are similar to those on the bridge and other parts of the midship superstructure, and will be described in the appropriate instalment so that they may all be made together.

THE LIFEBOATS

Before completing the superstructure the lifeboats should be taken in hand. When making the davits and their fittings they must be made to fit the boats, and it is as well to have the boats available. On *St Ninian* the boats are all made of wood and, consequently, they are more graceful in shape than the average steel lifeboat.

In a wooden boat the planks must be bent and, in bending, they automatically take the easiest and most graceful curve. Also they are clinker built and thus the natural, easy lines are emphasised by the edges of the planks. The lifeboats are a conspicuous feature of any ship, so in this model the builder has a fine opportunity to display his skill and craftsmanship.

There are six boats in all—five of them 26 ft long × 8 ft beam × 3 ft 3 in. deep, and one 27 ft long × 8 ft 3 in. beam × 3 ft 3 in. deep. This one has a motor in addition to rowing equipment. All the boats are double ended.

I suggest you build them on a former, using the method so successfully employed by C. A. Chapman, of Peacehaven, in the lovely Admiral's barge which was awarded a silver medal in the 1955 ME Exhibition. In this system the planks are fitted to the ends and the keel over a former, and the ribs are fitted in after removing the shell from the former. The drawing (Fig. 77) which is reproduced the actual size for the boats will illustrate the system.

The former—*E*, *G* and *H* in the drawing—must be made first. This is in two halves screwed together, with a layer of wood $\frac{1}{16}$ in. thick between them. The lower outline of this layer agrees with the shape of the inside of the keel, stem and sternpost, which may be taken from the constructional profile *F*.

The sections of the former are derived from the sections in the body plan *D* and are shown by the outer surface of the ribs in *C*; 1/32 in. must be deducted from each to allow for the thickness of the planking and they must be measured at the appropriate stations, 1, 2, 3, etc. At the forefoot and at the heel of the sternpost the former is cut away to wafer thickness so that the planking can terminate at the line shown in *A*. A groove $\frac{1}{8}$ in. wide is cut along the underside of the former where shown to accommodate the keelson.

A strip of planking material or 3 sheet Bristol board should be glued along the former as shown at *G*, its thickness being pared away to nothing at each end. This is required to keep the sheet strake upright and to prevent its sloping inward similar to the planks (Fig. 78).

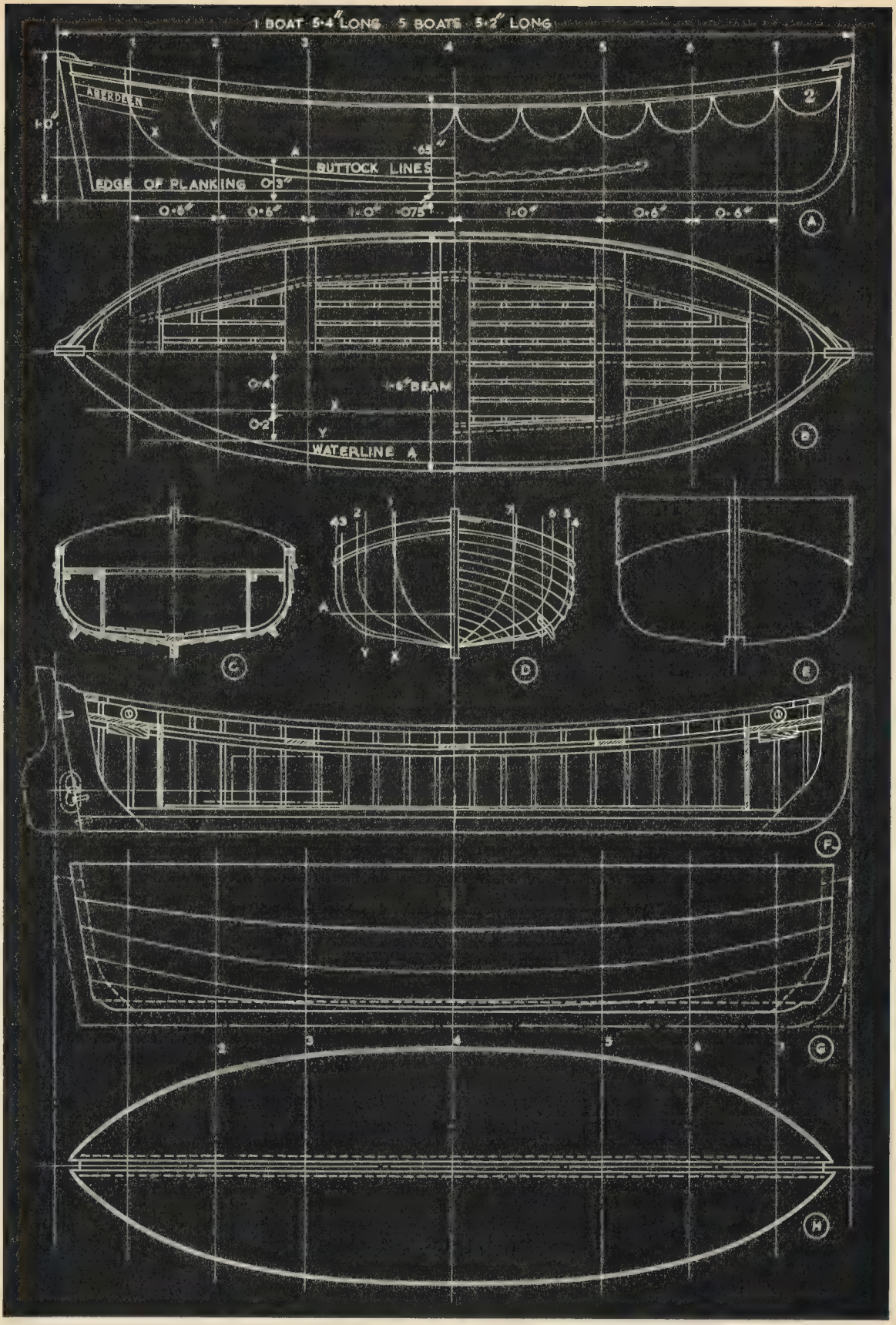
Fig 77 shows the 27 ft lifeboat and the cutaway sternpost with the propeller and engine indicated by dotted lines. When this boat is finished—or at least when the shell is finished—the former should be shortened by 0.2 in. to suit the 26 ft rowing boats. I have ignored the difference in beam, 3 in., as it amounts to less than $\frac{1}{16}$ in. at this scale.

The keel should now be made, using a close grained hardwood. Boxwood is the most suitable material. If unobtainable use sycamore or any similar wood. An old ruler or scale could be used, being of a suitable thickness and well seasoned.

The stem and sternpost, which are $\frac{1}{16}$ in. thick, should be cut from boxwood to the shape shown on the drawing, and half-checked and glued on to the keel. This seems a frail assembly for the backbone of a boat, but when the shell of the boat comes off the former it will be found quite strong enough. The keelson is pinned and glued along the top of the keel, and this adds considerably to its strength.

The assembly should fit firmly into

Forward lifeboat on the port side


1 BOAT 5·4" LONG 5 BOATS 5·2" LONG
ABERDEEN
1·0"
BUTTOCK LINES
EDGE OF PLANKING 0·3"
0·8" 0·8" 1·0" 0·75" 1·0" 0·8" 0·8"
A
0·4"
1·8" BEAM
0·2"
WATERLINE A
B
C
D
E
F
G
H

the groove along the bottom and ends of the former, and when it is in place you can begin planking.

PLANKING THE HULL

Boxwood is the best material for the planks as it can be safely reduced to the required thickness, and is strong and pliable at this thickness. Beautiful examples of boats made in boxwood are to be found in some of the contemporary models of old ships-of-war. Some very fine models of ship's lifeboats have been made using 3 or 4 sheet Bristol board for the planking, and veneer is sometimes used. It is up to the builder to use the material he finds most convenient.

Using 12 planks on each side and allowing for the overlap, the width of the planks amidships will be $\frac{1}{8}$ in. and this tapers toward each end. The run of the planks is shown in *D* and, though it may seem drastically curved in the drawing, actually the curve is quite gentle, rising up easily to each end.

Before starting the planking lines showing the run of the planks should be drawn on the former. The space below the strip on the former should be divided at each station into four equal parts and three lines drawn as shown at *G*. They will be found to approach one another toward the ends in easy curves and, if the planks are tapered so that each group of three lies between these lines, the result will be both pleasing and correct. The art of good planking is to see that the planks taper evenly throughout and that the edges are all equidistant from each other.

The planking should begin with the garboard strake, which is the one next to the keel. The planks should be laid in pairs, first on one side and then on the other. With a clinker-built boat such as this the ends of the planks should be thinned down, especially on the lower edge so that the line of the overlap disappears where it meets the stem and sternpost. This will be seen in the boats in the picture on page 582 (April 18).

The planks should be glued all along the edge where they overlap and at each end. To hold down the ends while the glue sets, the ordinary spring clothes peg can be used if its ends are cut away (Fig. 79). A piece of stiff card or plastic sheet inserted as shown will greatly assist the operation.

To prevent glue sticking to the former a piece of tissue paper should be laid over it before starting operations—and if the groove is too easy a fit the tissue paper can be used to ensure the keel being held firmly. (When I speak of gluing I presume that one of the modern resin-bonded glues will be used.)

Opposite, Fig. 77: A *profile*; B *plan*; C *cross section*; D *body plan and planking*; E *end view of former*; F *constructional section*; G *elevation of former*; H *plan of former*

Below, Fig. 78: *Enlarged section showing construction*; *Fig.* 79: *Clip for holding the ends of planks*

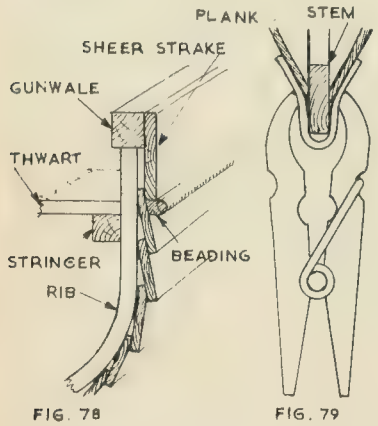


FIG. 78

FIG. 79

SHEER STRAKES

The last planks to be laid are the sheer strakes. These are laid over the strip of card or veneer on the upper part of the former and glued to the plank immediately below. Below the edge of this a strip of beading should be glued along the outside (Fig. 78). Bamboo is a very suitable material for this as it can be split in long lengths down to the smallest dimensions. A piece of cord of suitable diameter could be used, but bamboo would lie in a more even curve—which is important.

The little brackets along the top of the sheer strake at stem and stern should be made and fitted before removing the shell from the former. They are made of very thin wood to the shape shown in plan *B*.

When the glue is thoroughly set the shell may be removed from the former. Gunwales made of boxwood $\frac{1}{16}$ in. square must be glued along each side inside the sheer strake and two or three temporary spreaders pinned across them to preserve the correct beam and shape. Breast hooks just inside the stem and sternposts should be cut out of $\frac{1}{16}$ in. boxwood and pinned and glued in position. In *St Ninian's* boats the breast hooks are made of steel strip, but if made in wood for the model they will add greatly to the strength of the boats.

The ribs must be fitted next. I have spaced them 0.2 in. apart. They are relatively closer in the actual boats but the number I have shown will be sufficient and, I consider, will give the correct effect. They must be made of tough pliable wood about 1/32 in. square—or they might be a little wider. Ash is used in full-size boats, but boxwood would, I think, be best for the model. Bamboo is too springy.

In any event whatever wood is used it should be steamed or soaked in hot water and worked to shape between the thumb and fingers before fitting. From station 2 to 6 care must be taken to see that the ribs bed down into the bilge properly. At the ends of the boat the natural spring of the wood will follow the shape easily.

Stringers should now be fitted across the ribs and glued in position 5/32 in. below and parallel to the gunwale. Three thwarts 0.2 in. wide × 0.05 in. thick should be made and glued in position, resting on the stringers. The head and stern sheets should also be made and fitted.

A small piece of wood about $\frac{1}{8}$ in. thick should be glued on the underside of each to take the screw-eyes by which the boat is hung from the davits. Stringers must be fitted underneath the thwarts to form the framework for the buoyancy compartments, and pieces along the sides between the thwarts. These compartments should be completed by fitting thin sheets of wood vertically from the head and stern sheets and the side pieces down to the floor, fitting them around the ribs and keelson.

Floorboards of very thin wood should be glued to the ribs as shown in the drawing at *B*. Small screw-eyes must be screwed in the head and stern sheets, the distance between centres in each case being 4.4 in., this is the spacing for the davits.

Finally, the bilge keels must be made. They are 1/32 in. thick × 3/32 in. deep. It is better to carve them to approximately the curve of the bilge, heating or steaming them so that they fit closely before gluing them in place. The hand holes should be cut out before fitting.

FINISHING THE BOATS

The inside of the boat should be varnished, leaving the wood in its natural colour. This applies to the outside of the sheer strake and the beading below it. The remainder of the boat is painted white, and two or three coats should be applied to get a good colour. With a model of a clinker-built boat rubbing down is impossible and care, therefore, should be taken when painting to work along and not across the edges of the planks so as to preserve the clearness of the lines.

● *To be continued*

THE WORKSHOP SHAPING MACHINE

DUPLEX points out the advantages of this modern piece of workshop gear

THE small shaping machine appears to be gaining in popularity, if one can judge by the frequency with which these machines now form a valuable part of the workshop equipment. This is quite understandable because, apart from using a milling attachment, there are some kinds of machining that are hardly possible to carry out by rotary tooling in the lathe.

The casting of a simple type of bearing bracket illustrated in Fig. 1 is a case in point; for, though the lathe can deal with those surfaces that have free margins, the shaper is capable of machining all the remaining surfaces after the under surface and sides of the base have been tooled.

In this way both end faces of the two bearings lugs can be finished exactly parallel and, at the same time, the upper surface of the base can be machined square and flat.

To deal with a large casting in this way by hand filing is for some a tedious job and one that may be expensive in files, even where the casting has been previously pickled in acid to remove the surface sand and scale.

The latter process is not needed if carbide-tipped tools are used in the shaping machine, for these seem to be unaffected by machining iron castings in the state received from the foundry.

Although the milling machine will, for the most part, do the work of the shaper, it suffers from the disadvantage that even expensive high-speed steel milling cutters are liable to be blunted by the surface scale found on iron castings.

In spite of having built a grinding machine in the workshop for sharpening circular cutters and end mills, the labour involved in reconditioning blunted cutters usually makes me decide to use the shaper instead of the milling machine for dealing with work of this kind.

This machining difficulty may, perhaps, be one reason why some workers prefer the built-up form of construction to the more rigid assembly obtained by the use of iron castings; however, cast iron is usually regarded as a better material for machine slides than mild steel, and it may be that this is an additional reason for its extensive commercial use.

Whatever may be the merits of the two systems, iron castings present no difficult machining problems where the workshop is equipped with an efficient shaping machine.

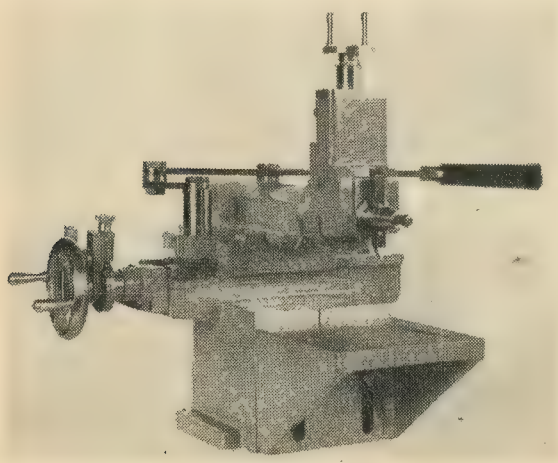
Just as the treadle lathe has now been largely superseded by its power-driven counterpart, so the hand-operated shaping machine seems to be losing ground to the power-operated machine, of which there are now on the market several relatively inexpensive examples.

The hand-operated machine illustrated in Fig. 2 is manufactured by Messrs Cowell and, as can be seen, is of robust construction; in addition, the design and workmanship have been found to be above criticism. In the later models the tool slide has been modified to enable the clapper box to be set over for machining angular surfaces. Although on a long job the use of a hand-operated machine may be found somewhat irksome, this type should not be despised.

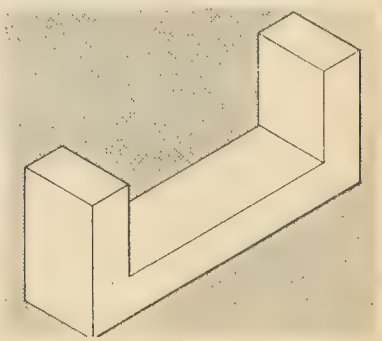
At one time the workshop was equipped with a Drummond hand shaper which proved to be a very accurate and robust machine both for surfacing work and for machining the V-slides of a vertical milling slide that was built from castings. In fact, after the slides had been machined in this way very little hand scraping was needed to obtain close contact and smooth working.

The shaper made by the Acorn Machine Tool Co. and illustrated in Fig. 3 is driven by a ½ h.p. motor and is designed for carrying out a wide variety of machining operations. The initial accuracy of the machine is of a high order and after several years of hard use in the workshop no falling off of the quality of machined work has been experienced.

The machine has a ram stroke adjustable up to 7 in. and the position of the ram in relation to the work is readily set. The slides and working parts are adjustable for wear and the table, which has a traverse of 9½ in., is furnished with an adjustable prop at its outer end to ensure that the table cannot tilt downwards under the cutting pressure of the tool towards the end of the ram stroke. A robust 4 in. machine vice is supplied with the machine and numerous accessories are



Left, Fig. 2: The Cowell hand shaping machine



Right, Fig. 1: An iron casting machined on all sides in the shaper

obtainable, including a rotary index table and a pair of dividing heads.

When selecting a shaping machine there are several features of design that should be sought for and expected. The ram, even when fully extended, should have a sufficient length of bearing in the ram slides to prevent any liability to tip at the extreme end of the power stroke. Similarly, an overhung table will require an outboard supporting pillar with a sliding foot to maintain rigidity and relieve the slideways of strain. To enable V-slides and angular work to be machined, the clapper box, as well and the tool slide, should be able to swivel and the latter should be capable of precise angular adjustment by reference to a graduated scale.

Both the length of the ram stroke and the position of the ram head in relation to the work should be capable of being easily adjusted, for these two settings may have to be altered whenever a fresh workpiece is machined. A really well-made machine vice is an essential accessory for holding the work squarely and without lifting when the jaws are fully tightened.

An automatic traverse is also required, but an automatic vertical feed for the tool slide is usually only found in the more elaborate and expensive machines.

One test for checking the accuracy of the machine is made by machining the surface of a piece of material, say, 3 in. square when held in the vice; after turning the work over and machining the other surface, the four micrometer measurements made at the corners should show no material variation of thickness.

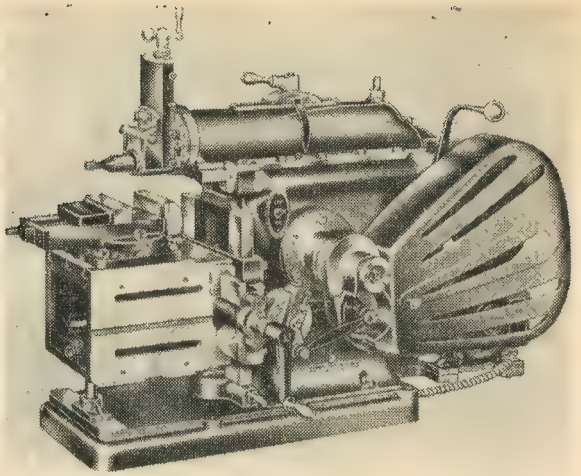


Fig. 3: *The Acorn Tools power-driven shaping machine*

The construction of the slides and moving parts should be examined to make sure that the initial degree of accuracy will persist when adjustments are made to take up wear.

Finally, see that there is plenty of metal in the machine and that it is well distributed to maintain rigidity; for taking a cut of even $\frac{1}{16}$ in. in depth in mild steel will absorb considerable power and will at the same time throw a heavy load on the working parts.

SHAPING MACHINE TOOLS

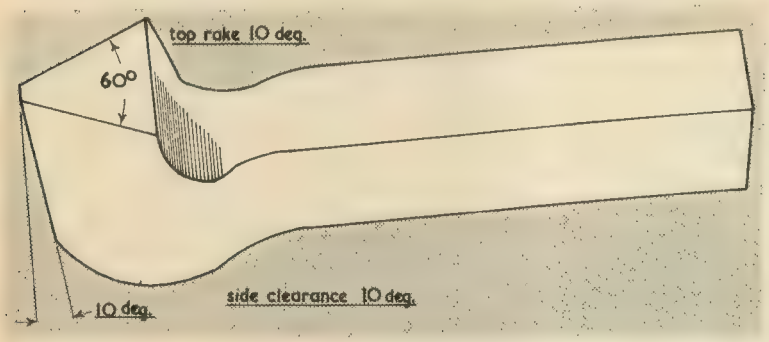
The general purpose surfacing tool illustrated in Fig. 4, although of rather old-fashioned shape, is designed for machining steel, cast iron, and non-ferrous metals and for this purpose it has several advantages. The tool will cut freely in either direction and the V-point largely prevents the formation of a burred edge as the tool leaves the work. If a top rake of from 5 deg. to 10 deg. is ground on the tool, free-cutting is encouraged and the work finish will be improved.

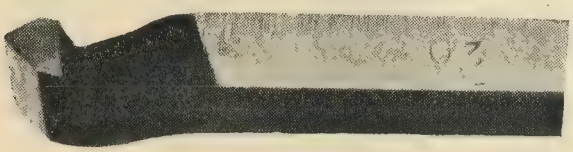
With a swan-necked tool of this kind the upper surface is more easily ground since it is of small area and has free margins on all sides; moreover, the great depth of the tool at this point enables grinding to be many times repeated before the tool is worn out. When grinding the front and side clearances, the tool should be rested on a parallel packing strip to raise the head clear of the surface of the grinding table.

The front cutting edge which is in contact with the work is an important part of the tool and at this point a small flat should be ground and afterwards stoned to a high finish so as to leave a correspondingly good finish on the work.

The length of this flat, which determines the area of contact between the tool and the work, must be at least equal to the distance traversed by the automatic feed at each stroke of the ram; otherwise a ridged surface will be left on the work. If the flat is too long and the area of contact too great, chatter may be set up where there is insufficient rigidity in the machine or in the work itself.

● *To be continued*





Figs 4 *and* 5: *A general purpose surfacing tool and (above) showing the grinding angles of the tool*

TOOLS FOR THE LATHE

A practical book by Duplex, *Lathe and Shaping Machine Tools*, is available from Percival Marshall, 19-20 Noel Street, W1, price 3s. 6d., postage 3d. It describes the selection and maintenance of tools for the lathe and shaping machine.

POSTBAG

The Editor welcomes letters for these columns, but they must be brief. Photographs are invited which illustrate points of interest raised by the writer

MYSTERY ENGINE

SIR,—Mr Illingworth's letter [Postbag, July 18] on the "Mystery Engine" interests me very much.

There seems little doubt to me that he is the fortunate owner of an early type steam-car engine. If my deduction is right the engine is about 56 years old. The H on the crankcase suggests an American make, the Hudson Steam Automobile.

The engine is reversible, but it seems by the description that the control valve is missing. Cylinder dimensions seem on the small side, but when one considers that steam was admitted for nearly the full stroke this would, with 160 lb. of steam, be quite a snappy little engine—but anything but economical.

The Hudson steam car was built by the Beau-Chamberlain Manufacturing Company, of Hudson, Mich, in 1906. It had two vertical cylinders, "cast in one piece." The tubular boiler was designed to take 160 p.s.i., the water tank held 21 gallons, fuel tank 6 gallons, and the weight was 650 lb. Speed was 25 m.p.h., and it was fitted with chain drive and tiller steering.

The Hudson steamer was not so well known as the Stanley or White and was only manufactured for about a year. The unit casting of the complete engine is unique, but the method of reversing is quite common; in fact ships' steering engines, windlasses and capstans (steam) still use it.

In a description I have of the Hudson it is stated that the cylinders were "cast in one piece." There is nothing unusual about that, but if it meant the whole engine was cast in one piece then I think one mystery is solved.

But the problem that remains is: How did the engine arrive over here?

Pembroke. JOHN M. HUNTER.

SAVED HIS CASTINGS

SIR,—I have been dabbling with tools and metal for some time now, but it was not until recently I had a go at a real steam engine, a Kennion's mill-engine, 1 in. bore × 1½ in. stroke.

As I came to grief over drilling the steam passages from the cylinder to the valvebox, I thought other tyros might like to know how I managed to save my cylinder casting.

What actually happened was that the holes landed up about ⅛ in. in front of the ports, so I cut a small channel from the holes into the ports, about ⅛ in. deep, and cut a false portface from 5/32 in. brass, drilling and filing the ports.

This was simply sandwiched between the portface and the valve chest with a good dollop of Sealco jointing. This is probably nothing new, and not very good engineering, but the whole lot gallops round merrily on a bicycle pump, so why worry?

I should also like to say that, very much against the advice of E.T.W. I finished the bore with a *brand new* expanding reamer. It produced a smooth, parallel, circular bore, free from any tool or chatter marks.

The reamer was put through in two stages, taking out about 0.002 in. each time. For the record, it was a Quick-set reamer, supplied by Mr Burke, who advertises frequently in this journal.

Now I have made my engine, funds are a bit on the low side to start a boiler, but I am itching to see it do its stuff on live steam, so I wonder if some sympathetic gent in this locality might let me try it out on his? I will provide my own coal!

The whole lot, except baseplate casting, was done on my 3⅜ in. plain lathe, my one and only machine tool, which wasn't very keen on turning the 6 in. dia. flywheel.

Welwyn Garden City, Herts. R. KNEE.

END OF THE LINE

SIR,—My picture shows the end of the line for this beautiful 4-8-4 Lima locomotive 4435, Southern Pacific. She will be scrapped right there. Her size is shown by the man on the front step.

Vacant space above headlight is for the swivelling headlight, used on these express trains. The beam swings from side to side and up and down, giving exceptional vision and an effective warning.

San Mateo, California. G. ROSEKILLY.

The last resting place of No 4435 *Southern Pacific* 4-8-4 *Lima locomotive*

WINDERMERE STEAMER

SIR,—From time to time you publish short descriptions of interesting engineering installations and equipment, and I wondered if anyone had ever come across the attractive little passenger vessel *Tern* on Lake Windermere, which I observed on a recent visit to those parts. I was able to obtain the following details.

She was built in 1891 by Rennie and Foster (now extinct) at Wyvenhoe, Essex. This is the last year she will run with her original steam engine, as British Railways are intending to fit her with diesels, in line with all the other Railway boats on Windermere.

She has two non-condensing engines working at 100 p.s.i., but this figure varies as there seems to be considerable difficulty in keeping a steady pressure to cope with the varying demands ! The valve gear, I understand, is Stephenson's link, and the steam is supplied by a small locomotive boiler, which, owing to the restricted space, has to be fired from either side of the fire-box instead of the rear as usual.

She is controlled from a very exposed position on the deck and the engineer has two very hot stop valves as his regulator ! The twin propeller shafts rotate at 135 r.p.m. at top speed, which is about 11 knots.

To sit in this little ship and sail over the placid waters of Windermere, with the soft exhaust beat from the 61-year-old engine, is an experience strange to the 20th century.

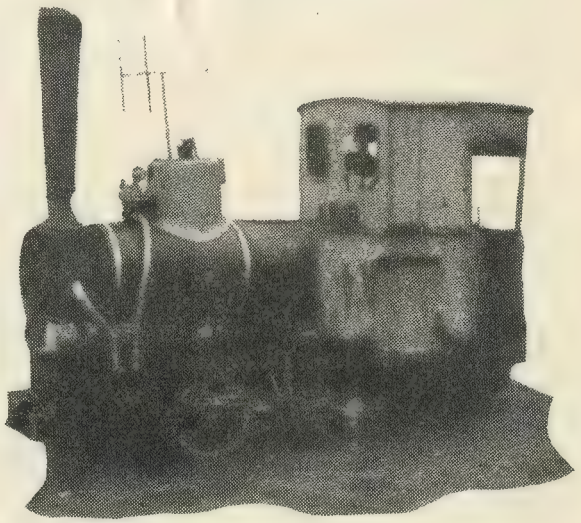
If anyone wishes to see *Tern* before she adopts the more modern power plant, this season is his last chance !

Dartford, Kent. K. STOCKER.

WITH ATTACHMENTS

SIR,—The enclosed amusing photograph of a contractor's narrow gauge locomotive with modern appurtenances was taken in a quarry at Newlyn.

Stoke-on-Trent. C. P. JOBLING.



A contractor's narrow-gauge engine with some modern devices

18-POUNDER

SIR,—As the builder of the 18-pounder gun referred to by Mr Mylward [Postbag, July 18], I can assure him that there is no flare or swell at the muzzle of the prototype —according to the official handbook from which the details were taken— and consequently none on the model. The barrel actually has a slight regular taper, the smallest diameter being at the muzzle.

The reason for the bright steel finish on the barrel—indeed, on the entire model—is because the latter was intended as an example of craftsmanship. Had it been painted it could have been made in some metal easier to work (brass, aluminium alloy, etc.), but so far as possible similar materials to those in the original were used.

I agree entirely about the guide ribs, but here I must claim some licence as, owing to limitations of equipment (I use a modified 2½ in. plain lathe, which does not allow of long end milling), I was unable to follow full-size procedure exactly. The flat strip on the top was the nearest alternative.

Wembley Hill, S. A. WALTER.
Middx.

SIR,—Your contributor S. A. Walter says that the 18-pounder was developed from the French 75 mm. which had been opened up to 3 in. The 18-pounder was not a 3 in. gun. Many people talk about the 18-pounder but very few could tell one the size of the bore. The bore was 3.3 in. and not 3 in. It is quite possible for anyone looking at a painting of a gun to mistake a 13-pounder for an 18-pounder. The 13-pounder was a 3 in., 20 cwt gun and could easily be mistaken by a person with little knowledge of guns and amunition.

Please don't think I am in any way trying to discredit anything about the model or its builder; it was a well-built and lovely model.

I spent from 1913 until the end of the last war working on amunition of all sizes and more particularly its assembly and filling.

Dartford, Kent. H. B. PACKMAN.

WELDING WITH CALOR

SIR—I would like to suggest to L.N.J., Leeds [Readers' Queries, July 18], that he gets in touch with the local distributors of Calor Gas; I think he will get all the information he desires.

I was in the same predicament about 10 years ago, and they sent a technical representative to see me. They supplied me with a lovely small torch, with 10 jets, and I got oxygen from the British Oxygen Company. With this outfit and Easyflo solder it was surprising what I could do.

For many years, when in business, I used oxy-acetylene, but for model work oxy-Calor is far more useful. I also made various sizes of Bunsen burner, which are most useful with Calor for soft soldering.

Southport, HARTLEY PARKINSON.
Lancs.

SUPERSONIC DRILL ?

SIR,—Can anyone tell me where I can find sufficient technical data to enable me to build a small experimental drill utilising the principle of ultrasonic vibrations produced via high frequency a.c. currents ?

Nottingham. T. S. FRETWELL.

PICKERING GOVERNOR

SIR,—I note in your issue of July 18 that W. J. Hughes claims his portrayal of the Pickering governor to be probably the first time that this instrument has been offered to model makers in model form.

This is not quite correct, and although I have no desire to establish any record, I would say the Pickering governor is shown, completely detailed, in my drawings of the model Burrell showman's road locomotive *Thetford Town*, this publication being produced in 1954.

Norwich. RONALD H. CLARK.

OLD BEN

SIR,—Four years ago I had an evening to spare in Auchinleck so I wandered along to High House Pit just on the chance that there might be something of interest. Among several items I saw the beam engine Old Ben, illustrated in the July 25 issue. I would be surprised if it were 150 years old, and even more sur-

prised if there are no more single-cylinder beam engines at work. (Or does the writer mean an identical engine?)

I can quite believe that it formerly had a hand gear, as this was often the case with single-cylinder engines used for winding or hauling. At no time did a lad or anyone else control the stroke—the crank did that.

Whoever took the photograph, took it at just the right time. The house and floors have been removed but the engine is still intact.

A careful study of the picture reveals several interesting points. (1) Unlike most beam engines but like most models it is mounted on a bed plate. (2) A very unusual feature is slide bars in place of parallel motion. The only other cases of similar guides that I know of were on some Cornish beam winding engines that had round slide bars; and those very large beam engines used on American paddle steamers. These seem to have had channel-section guides.

Note, also, how much thicker the beam is in the centre than at the ends, and also how large and slender the flywheel is. Then turn to page 32 [July 4]. Which of the two—Ben or Vulcan—has most right to be kept in a museum?

Shipley, Yorks. FRANK D. WOODALL.

TURNRICE PLOUGH

SIR,—Your contributor who found inspiration in the old turnrice plough [Postbag, July 18], which incidentally always walked off with the premier awards at the local ploughing matches back home, may be interested to know that the words of command shouted at the "hosses," were "Hup" for turning to port, and "Huther" for the starboard turn.

On the subject of diesels, damned and otherwise, this newer form of motive power has just started to replace the Schools class steamers, and the change has made the correspondence of local papers fairly sizzle. Recently one of your own readers described a steam engine as something "with its guts hanging out."

It may interest this reader to know that after several journeys up to town behind a diesel electric, the awful stench that pervades the whole train, to say nothing of passing through tunnels, has convinced me that the diesel engine's innards have been hanging out longer than any steam engine.

Re the veteran coach: Our Brighton friend [Postbag, July 25] should remember that it is in Kent where the first cherries are picked. Malleable wheels were common round my home long before the Kaiser's war. In fact, the only wooden wheeled wagon we ever saw was a Sentinel type steam wagon built by a Maidstone firm with the strange name of Jesse Ellis.

Chain cases never appeared until after that war, the first being on the Halfords, these a product of the well-known Dartford firm of refrigeration engineers. But the driver of the village farmer's wagon was quick to see the disadvantages of these "new fangled guards." "Why ya carn't see if the chains is too tight or too slack or if they wants agreasin'."

He was certainly right about the chain adjusters as well, because these were never part of the chain guard. How could they be? The adjuster pushed the axle back in its massive chassis slots which housed the axle bearings. As for that early example of steering column gear change—the array of rods, angle levers and locking devices must have rivalled the point system outside Victoria Station.

Sedlescombe, Sussex. GEORGE W. EVES.

SIR,—Referring to a letter and photograph of a horse drawn plough Mr Ford's letter agrees with my recollection of these ploughs as used in SE Kent, but the photograph does not agree with my model of a Kent plough.

The chain and long link behind the axle should surely extend to a fitting at the base of the handles, and be adjustable.

Headington, Oxford. G. EASTES.

Imitation of Mississippi steamboat at Liberty Park in Salt Lake City. It is powered by a petrol engine and takes 50 youngsters twice round the lake for 20 cents

ROSE . . . continued from page 272

material for glands and put gaskets of thin oiled brown paper or 1/64 in. Hallite between the cylinder covers and block, and between cylinder, steam chest and cover. The complete assembly should be exactly 2 in. wide to fit between the frames without spreading or distorting them.

If it is found that the cylinder won't go in easily reduce the overall width by removing the steam chest and taking a little off the contact face that goes next to the cover. There is plenty of latitude here, as I fitted a similar cylinder assembly to the frames of the LMS 4F mentioned in the previous instalment by taking a full $\frac{1}{16}$ in. off. This engine had 3/32 in. frames with $1\frac{15}{16}$ in. between them.

The complete assembly is located between the frames in the position indicated by the dotted lines in the frame drawing. The middle of the front cylinder cover should be approximately $\frac{5}{8}$ in. from the back of the leading buffer-beam. The front end of the cylinder should be $\frac{3}{8}$ in. below the top of the frames, and the slope or angle should be such that the centre line of motion should cut exactly across the middle of the crank axle when the axle boxes are in running position. This is easily checked by pulling out the piston rod as far as it will come and putting a straight close-fitting piece of tube over the end; this should pass centrally between the crank webs level with axle centre.

Adjust the cylinder to the position stated, then put a big cramp right over the outside of frames to hold it there. Put a No 41 drill through the screwholes in the frames, on each side, making countersinks on the cylinder block and steam-chest cover.

Remove the cylinder, drill the countersinks No 48 and tap 3/32 in. or 7 BA. Don't bother to put the cylinder back yet because it cannot be permanently erected until the guide bar, crosshead and connecting-rod are fitted—and that will be the next job.

● *To be continued*

JINX ON THEM ?

SIR,—With regard to Vulcan's statement [Smoke Rings, July 25] that *Berkeley Castle* is a dud among a fleet of engines with otherwise a good reputation, I am connected with the the motor industry, where a similar state exists, it being quite common with an operator of a fleet of cars or lorries to have a dud which will not respond to any treatment, including rebuilding.

These vehicles have what we call a jinx, and the only course open to the owner is to pass the dud on to another unfortunate owner, or consign it to the scrap yard.

Cases have been known of such vehicles being involved in accidents when no apparent cause has been established.

It certainly seems as if the mechanical world has its trouble makers, the same as in the human world.

Bognor Regis, Sussex. R. B. CUNNINGHAM.

TRY AGAIN !

SIR,—With reference to " Old Friends " [Smoke Rings, August 8] the engine's name was *Try Again*, not *Tiny Tim*.

Cottingham, Yorks. H. LAKEMAN.

TAR SPRAYING

SIR,—Mr Illingworth's engine [Postbag, July 18] was built by the Sentinel Wagon Works Ltd. It was designed originally as a hoist engine for millers' wagons, and was later fitted on tar sprayers to drive the tar pump.

I have three Model S tar spraying wagons, each with one of these engines, and I have one spare engine. They are very reliable, but must have a good supply of cylinder oil. They use a lot of steam, as the piston valves do not have rings. All the engines and wagons were rebuilt before being put into service, the little engines doing about four seasons' work without being touched.

Bucknell, Shropshire. R. M. WOOLLEY.

SIR,—In reply to Mr H. A. Illingworth I would suggest an inquiry to Sentinels, who may be able to indentify this engine and may well be the builders.

The white metal coating on the valves may be an electrical deposition of chromium as I have seen this applied to shuttle valves on Halls steam pumps.

Certainly this engine appeals as a suitable basis for a small power steam engine design, although as far as models are concerned most of us like to see the wheels go round. It would, of course, call for initial planning and I feel that many engines grow like Topsy or originate on the back of an envelope. Some knowledge of pattern making would be required and many amateurs fight shy of this.

The casting, even for a small engine, would be quite large, and most amateurs have definite limitations to their machining capacity.

Shaldon, S Devon. C. F. PARSONS.

STEAM CARS

SIR,—For some time I have been very interested in the possibilities of converting a modern i.c. car engine to steam.

I confess that cars do not interest me in the least, as I gave up running a car in 1931, but there is a lot to be said for basing a steam engine design on a standard Ford or Morris unit, and I gather that the design described, criticised, and now supported by Harman Lewis is based on the Morris 8.

Personally, if I had been scheming out such a conversion, I should without hestitation have taken a leaf out of Bassett-Lowke's *Sirius*, rather than key a split eccentric sheave on to one throw of the Morris crankshaft.

Water will, of course, be a great trouble in the design as proposed unless means are provided to drain it away when warming up. I do not think that the argument about the S-type Sentinel is logical. For a start, the Sentinel engine is horizontal; secondly, with the camshaft in the draining position, the cylinders can be warmed up and water cleared out, and thirdly, of course, the Sentinel was developed as a steam engine and the water problem cared for in every way.

I assume that " Headroom " is a vital factor in car conversion, but if the space permitted I would much prefer the Bolsover Rodgers system to the one described.

There is no question that a simple and workable conversion of a Ford or Morris 8 might be very useful indeed; anyhow it makes us all scratch our heads and think of improved ways of doing it and that keeps us out of mischief.

Devizes, Wilts. KYRLE W. WILLANS.

VACUUM WELDING

SIR—With reference to your reader's query on welding and brazing [ME, July 18] I have successfully used a vacuum cleaner for this work. The machine in question is a Vactric cylindrical model, which I bought about five years ago. This machine, which can be used to suck or blow, is very powerful. I made up a tapered off tube to fit the flexible pipe, the other end fitting a length of stirrup-pump hose.

I use a ½ in. blow pipe connected to the household gas supply and I have successfully brazed up the boiler of my 3½ in. gauge *Rainhill* in course of construction. Of course, while in use the end cap and dust bag are removed to assist the blast.

I hope this information will be of use to your readers, who could do themselves as well as their wives a good turn by purchasing a cleaner such as this.

Birmingham, 26. E. F. GOUGH.

TWO ENGINE QUERIES

SIR,—While out motoring the other day, I came across a traction engine standing in a farmyard near the village of Fifield in Oxfordshire, not far from Burford. The engine was well sheeted with tarpaulin so the cylinders, etc., were not visible. The front wheels were exposed, however, and had wide treads as used on ploughing engines. There was a wide tool box on the front axle.

The rear wheels as far as could be seen again appeared smaller than is usual on traction engines. In fact the engine did not give one the impression of being large or long enough for a P/E.

On the smokebox door was the usual circular nameplate bearing the name R. J. and H. Wilder, Wallingford. The registration plate affixed to the chimney bore the number BL 4150.

Some time before, I noticed standing on the forecourt of a garage on the main Oxford to Shipston on Stour road, a steam road roller (in steam) about half or just over the size of a normal roller.

The odd thing about it was the boiler, which, instead of being parallel, was sloped up from the firebox end to the smokebox at a steep angle. I did not have time to stop and investigate.

Can any of your readers give any details of these two engines ?

B. W. WARREN.

SCALE PROBLEM

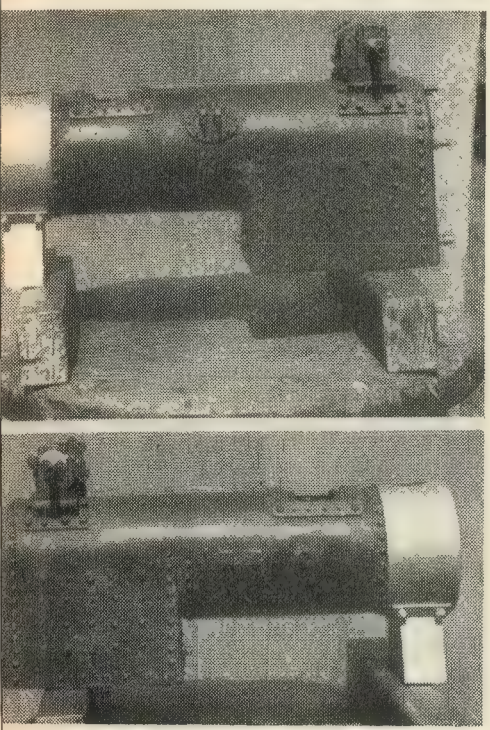
SIR,—It may possibly be of interest to your readers that I am now building a series of seven whale boats in ½ in. scale for a proposed whale ship model. The problems of reproducing the scale thickness of the whale boat walls, which are actually only ½ in. thick in the prototype, was a very knotty one. This was solved by the use of a polyester resin plastic mould, impregnated with glass cloth, formed over a waxed hardwood form. The resulting model is about 14 in. long.

Atlanta, Georgia, USA. E. B. FELDMAN.

READERS' QUERIES

Do not forget the query coupon on the last page of this issue

This free advice service is open to all readers. Queries must be on subjects within the scope of this journal. The replies published are extracts from fuller replies sent through the post: queries must not be sent with any other communications: valuations of models, or advice on selling, cannot be given: stamped addressed envelope and query coupon with each query. Mark envelope "Query," Model Engineer, 19-20 Noel Street, London, W1.



Blackening brass, bronze

I have a number of brass and phosphor bronze fittings (for a 1½ in. scale traction engine) which I wish to turn black, without using paint.

Silver nitrate has been tried, but is not sufficiently permanent. I have also tried immersion of the parts in a mixture of ammonia 20 parts, natural malachite one part, but this, too, was not a success as I was not able to make the malachite dissolve. —WJ, Andover, Hants.

▲ *A simple but effective method of blackening brass or bronze is to immerse the parts in a solution made up of 1 oz. of copper nitrate dissolved in 3 oz. of water. This solution acts in a few minutes and gives the surface of the metal a good black finish which is practically permanent. Copper nitrate, however, is a poison, so care is needed in its use.*

Recognition of boiler

My photographs are of a partly-completed overtype semi-portable engine which I have recently purchased. I should be grateful if you would tell me whether the engine is based on a design that has appeared in MODEL ENGINEER. The boiler is of the fine tube pattern and has a number of cross tubes in the fire-box. The cylinder assembly comprises two h.p. pressure cylinders (not shown) and the boiler is complete with double crank.—RTB, West London.

▲ *This boiler does not appear to belong to any engine that has been described in ME. In all probability it is a freelance design by its builder; none-the-less it is very well made.*

Any information which readers may be able to supply will be passed on by this office.

Battery charging

A short while ago I bought some miniature Exide batteries for my model boats, and find they have to be charged at 0.2 amps. As my charger charges at 1 amp could you tell me how I can convert it to charge at 0.2 amps ?

One further point: I may be going to Tasmania shortly. Could I empty these batteries and refill them with acid when I arrive ? The journey would take five to six weeks.—SJB, Bradford, Yorks.

▲ *It is possible to reduce the current output of your trickle charger by adding a resistance in series with the battery charging circuit. The exact amount of resistance needed will depend on various factors—including the internal resistance of the battery itself—but if possible it should be checked with an ammeter in the circuit. A small low-consumption flash bulb would probably give something like the right resistance for the purpose.*

It is practicable to empty the batteries and rinse them out with distilled *water, then dry them out as thoroughly as possible. However, the batteries should first be fully charged; they will then last indefinitely in the dry condition and will be ready for reuse in a few hours after refilling with acid of the specified specific gravity—which is usually about* 1.200.

ME hydroplane

I have just completed the framework of a 24 in. circular course racing hydroplane designed by Edgar T. Westbury. It is the first time I have tackled model boat building and would be obliged if you could answer the following:

1 What is the best material to cover the hull ?

2 Where can an engine from 5 c.c. to 10 c.c. be bought ?

3 Is the propeller driven directly from the engine or through gears?—RMM, Longtown, Cumberland.

▲ 1 *The material recommended for covering the hull is aircraft quality 3-ply, 1 mm. thick. This is obtainable from most firms dealing with model aircraft or boat building supplies. It is possible to use thicker material—up to* $\frac{1}{16}$ *in.—but this will, of course, increase the weight and will probably be found somewhat more difficult to fix in place. An alternative method of covering the hull would be by double diagonal planking, but this is a somewhat difficult method for anyone who has not had previous experience.*

2 *As far as can be ascertained, no engines over 5 c.c. suitable for this purpose are available ready-made. A number of compression-ignition engines and glow plug engines of various makes can be obtained up to 5 c.c. from Ripmax Ltd, 39 Parkway, London NW1, who would also be able to supply a suitable propeller for the engine chosen.*

3 *Direct drive of the propeller is recommended, as the use of gearing would complicate the installation and also probably reduce efficiency to some extent.*

Making use of eccentrics

I intend to try and make a crank axle from the solid for a 5 in. gauge *Minx*, complete with eccentrics for Stephenson's link motion, and would like your advice as to the angle of advance to give best results.—AB, Newton Grange, Midlothian.

▲ *You are not recommended to do this in so small a model as a 5 in. gauge locomotive. It would be a far better proposition to make use of separate eccentrics, the exact positions of which can be adjusted when setting the valves after the engine is complete.*

CLUB NEWS

EDITED BY THE CLUBMAN

LOCOMOTIVES running, locomotives examined, locomotives talked about: such was Maskelyne Day at Tonbridge with JNM, once more the guest of Tonbridge Model Engineering Society. Warm sunshine added to the happiness of the occasion, and large numbers of passengers kept four locomotives busy during the afternoon.

The Tonbridge track, in a delightful, shady corner of the castle grounds, has been extended considerably and now reaches to the car park, an amenity appreciated by visitors.

Engines in steam included a fine 5 in. gauge *Maid of Kent*, which, although in running order, has yet to be finally finished and painted; a delightful 3½ in. gauge Kent and East Sussex Railway 2-4-0 tank *Northiam*; a very neat freelance outside cylinder 4-4-0 engine with a remarkably snappy exhaust beat, and, finally, a 3½ in. gauge GWR 4-6-0 County, a splendid runner and powerful hauler which, however, developed a cracked feed pipe and had to retire just when the influx of passengers was at its height.

Room for four engines

Although the Tonbridge track is not one of the largest, there is room for four engines to be in steam and for each to show its paces between stops.

Tea was served *al fresco* by the ladies, and when all was over another day had been added (I am sure) to the happy memories of at least one of the participants.

BY ROAD FROM BURTON

One of the engines on the extensive track at Beech Hurst, Haywards Heath, when **SMEE** was entertained there by the **Mid-Sussex LS**, had arrived—by road—in a specially contrived wheeled container from Burton-on-Trent.

This long-distance visitor was S. Applewhite's remarkable 5 in. Peckett 0-4-0 saddle-tank engine, which many of those present had not seen in steam before. The engine behaved perfectly and fully justified its long journey from the Potteries.

Several locomotives were steamed. Victor Storey's fine 4-6-4 Tilbury tank will not round curves of 30 ft radius or less and, consequently, most of its running is done at exhibitions and fetes where there is a straight up-and-down track. But at Beech Hurst the curves were not too sharp and the engine showed its power and speed—to the delight of all who were privileged to drive it.

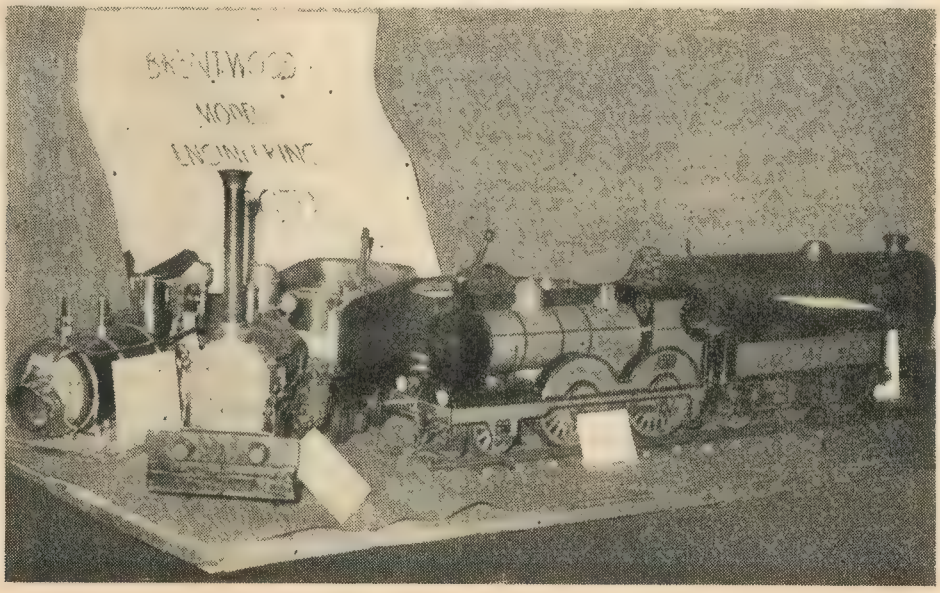
Another engine which ran consistently well for some four hours was a 5 in. gauge Southern 2-6-0. This model, too, makes plenty of speed when the road is clear.

Other successful performers included a 5 in. gauge *Maid of Kent* and a very well constructed 3½ in. gauge GNR Atlantic.

From all aspects the day was enjoyable; and, as usual, it passed all too quickly.

ME DIARY

August 24 Huddersfield SME regatta.
Birmingham SME track at High Duty Alloys sports field, Redditch.
Bethnal Green SMEE at Borough of Leyton Show, Coronation Gardens, Leyton, London.
August 25 Malden and District SME annual loco gala day. Invitation to all ME Exhibition visitors.
August 30 Birmingham SME portable track at West Bromwich show.
August 31 Last day of Model Engineer Exhibition.
September 1 MPBA Grand regatta.
September 6 Rochdale SMEE "Building the Seal," H. Bonsor.
Manchester SMEE meeting, Onward Hall, Deansgate, 7.30 p.m. Film show.
September 7 NAME meeting, Onward Hall, Deansgate, 2.30 p.m. Following business film "Story of Steel" will be shown.
September 8 Birmingham SME national rally, Campbell Green (September 8 and 9).
IRCMS, Kingsley Hotel, London, WC1.
MPBA Altrincham regatta.
September 13 Birmingham SMS, "The Panama Canal," Capt. F. J. Marsden.
September 14 Huddersfield SME club invitation weekend (September 14 and 15).
Birmingham SME Boy Scouts Day, Campbell Green.
September 15 MPBA Blackheath regatta.
Birmingham SME Members' Social Day, Campbell Green.
Worcester and District MES public running day, Diglis, 11 a.m.



Some of the Brentwood society's exhibits featured at a local handicrafts show. I hope to write of this shortly

Model Engineer

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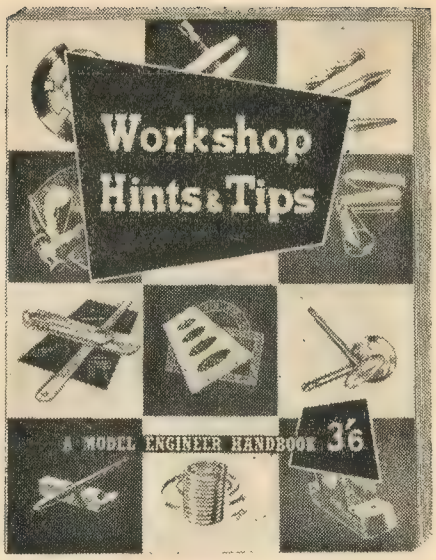

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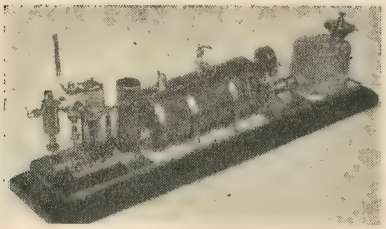

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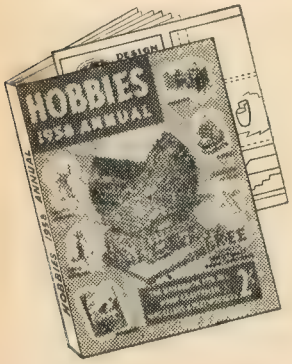

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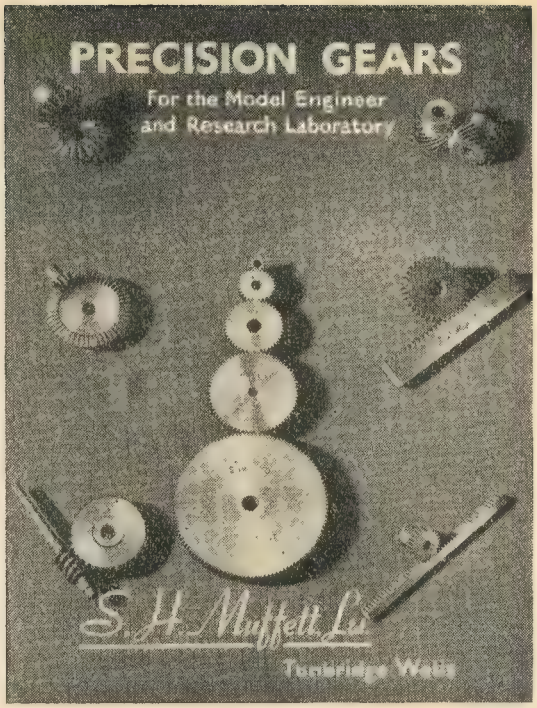

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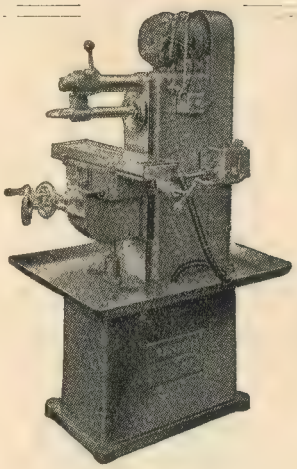

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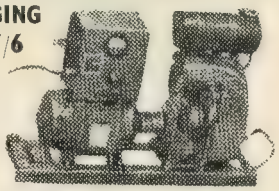

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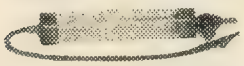

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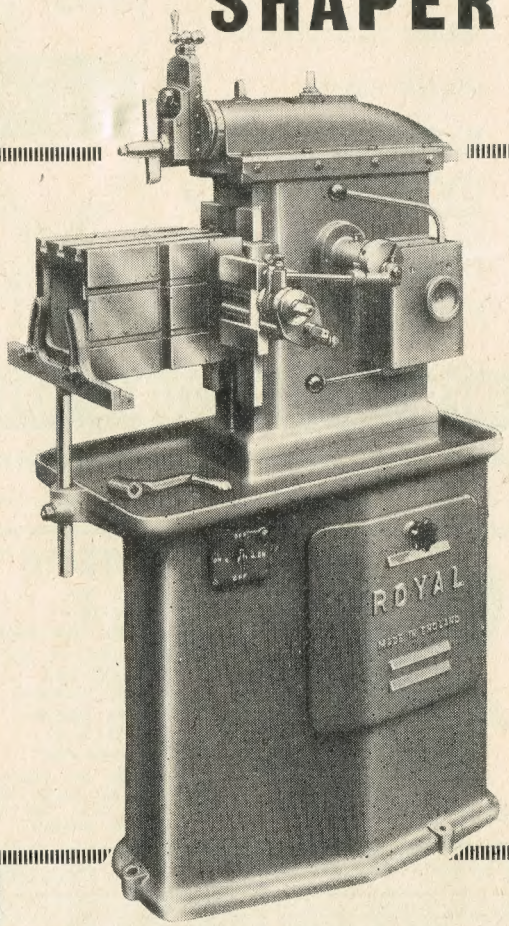

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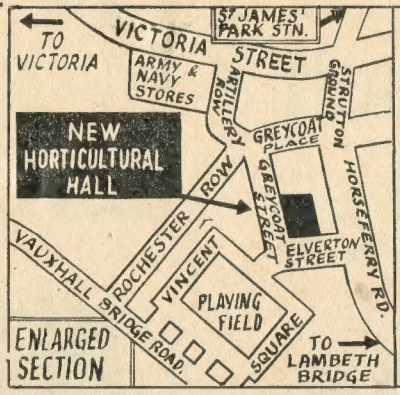

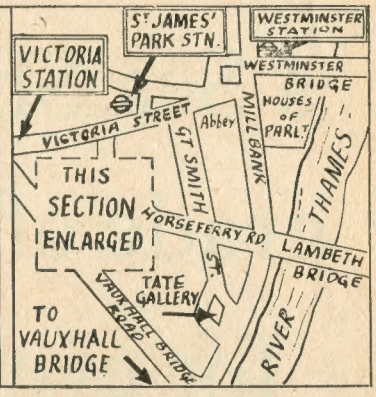

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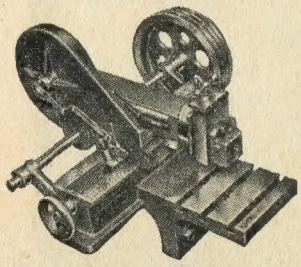

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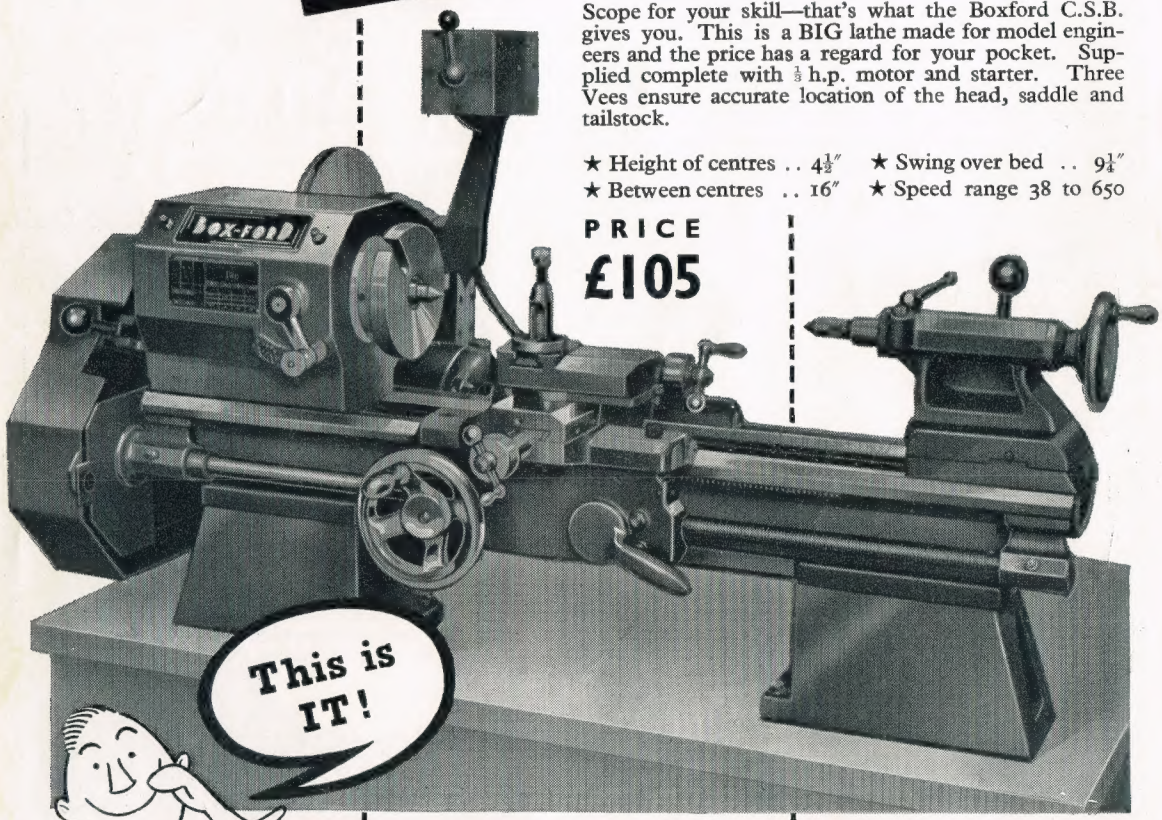

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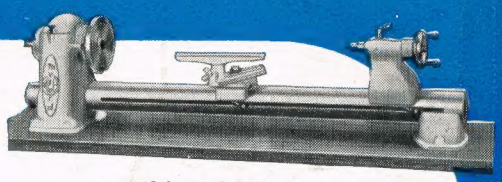

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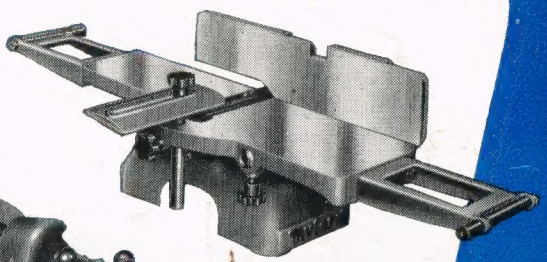

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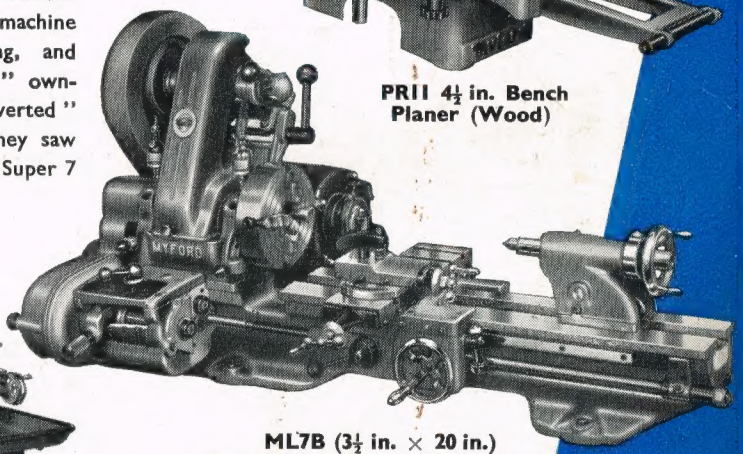

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